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# Household Living Arrangement and Quality of Life in Adults with Mental Illness

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Graduate Program in Epidemiology and Biostatistics  
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## Abstract

Background: Household living arrangement, whether an individual lives alone, with family, or with unrelated persons, may predict quality of life in adults with mental illness, as it influences social interactions and availability of immediate resources. Objective: To assess the relationship between living arrangement and quality of life in adults with mental illness. Design: Secondary analysis of 294 community-dwelling adults with mental illness. Linear regression was used to estimate the association between living arrangement and quality of life. Results: Initially, linear regression analysis did not suggest a strong association between quality of life and living arrangement; however, further analysis suggested that social support mediates the relationship between living arrangement and quality of life in adults with mental illness. Conclusion: Future research should address the limitations of the current study to advance the understanding of the association between living arrangement and quality of life in this population.

## Keywords

Mental health, mental illness, quality of life, living arrangement, social support, linear regression, cross-sectional studies, mediation, moderation

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All parts of this thesis were written by M. McKillop and reviewed by M. Speechley and C. Forchuk. In addition, I established the research objectives and conducted all analyses under the guidance of M. Speechley and C. Forchuk.

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# Chapter 1

## 1 Introduction

Mental illnesses are characterized by alterations in thinking, mood or behaviour and result from complex interactions among social, economic, psychological, biological and genetic factors (Public Health Agency of Canada, May 2015). They can begin at any age, may be episodic or chronic and are often associated with significant distress and impaired functioning (Public Health Agency of Canada, May 2015). Symptoms of mental illness vary from mild to severe, and depend on the type of mental illness, the individual and the socio-economic environment (Public Health Agency of Canada, May 2015).

Mental illness has the potential to impact every aspect of an individual's life including relationships, education, work and community involvement (Public Health Agency of Canada, May 2015). According to the 2010 Global Burden of Disease Study, in Canada mental and behavioural disorders account for 23% of years of life lost due to disability and 13% of years of life lost due to disability and premature mortality (Public Health Agency of Canada, July 2015; Institute for Health Metrics and Evaluation, 2014).

There are also substantial economic costs associated with mental illness. In 2008, the direct costs (i.e. hospital care, physician care and drug expenditures) of mental illness in Canada were estimated to be approximately \$8 billion (Public Health Agency of Canada, March 2014) and the Public Health Agency of Canada recently reported that indirect costs (i.e. costs associated with disability claims, lost productivity due to absenteeism and presenteeism, and social and judicial services) range from \$11 to \$50 billion annually depending on the expenditures included (Public Health Agency of Canada, March 2014).

Mental illness can also influence an individual's quality of life. Research has demonstrated that quality of life in adults with mental illness is significantly lower than that of the general population (Ishak et al., 2011; Madhav & Buesching, 2001; Ishak et al., 2012; Olatunji, Cisler and Tolin 2007; Mendlowicz & Stein 2000) and lower when compared to those with chronic



physical conditions including but not limited to: hypertension, cancer, chronic back pain, diabetes, heart disease, arthritis and chronic lung problems (Gladis, Gosch, Dishuk, & Crits-Christoph, 1999; Ishak et al., 2011; Michalak, Yatham, Kolesar, & Lam, 2006; Pinikahana, Happell, Hope, & Keks, 2002; Olatunji, Cisler, & Tolin, 2007).

Researchers have begun to investigate determinants of quality of life in adults with mental illness and have identified a number of statistically significant clinical, demographic and psychosocial factors (Fleury et al., 2013; Hansson, 2006; Rapaport, Clary, Fayyad, & Endicott, 2005; Lam & Rosenfield, 2000; Yanos, Rosenfield, & Horwitz, 2001; Narvaez et al., 2008; Eack & Newhill, 2007).

A potential predictor of quality of life in adults with mental illness is living arrangement. It is defined as household composition and an individual can live alone, live with family or live with unrelated persons. Living arrangement may be an important predictor of quality of life in adults with mental illness, as it influences an individual's pattern of everyday or household social interactions (Joutsenniemi et al., 2006). Household social interactions, defined as the exchange between two or more individuals within the home environment, can be: (1) supportive, preventing social isolation and providing meaningful engagement; or (2) negative, reflecting relational conflict and stressful obligations (Joutsenniemi et al., 2006; Henning-Smith, 2014). While research has demonstrated that social interactions are significant predictors of quality of life in adults with mental illness (Yanos, Rosenfield, & Horwitz, 2001; Lam & Rosenheck, 2000; Hansson & Bjorkman, 2007), the relationship between household social interactions and quality of life in this population is less well understood.

The purpose of this thesis is to investigate the association between quality of life and living arrangement in adults with mental illness. As living arrangement is influenced by socioeconomic and demographic characteristics for which intervention may be available, it is important to better understand its relationship with quality of life.

This thesis is organized as follows: Chapter 2 contains a review of the literature; Chapter 3 lists the research objectives and hypotheses; Chapter 4 describes the methodology; the results are presented in Chapter 5 and discussed in Chapter 6; and Chapter 7 presents concluding remarks.

## Chapter 2

### 2 Literature Review

#### 2.1 Quality of Life in Mental Health Research

In mental health research, treatment efficacy has traditionally been assessed in terms of objective measures such as rate of relapse, hospitalization, degree of symptom reduction, need for adjuvant treatment, return to work, or clinician-assessed episode intensity (Gladis, Gosch, Dishuk, & Crits-Christoph, 1999). However, in recent years, quality of life has been increasingly used as an outcome measure in mental health care evaluation and clinical trials to reflect the patient's perception and subjective experience of treatment (Gladis, Gosch, Dishuk, & Crits-Christoph, 1999).

##### 2.1.1 Definition

Quality of life is a multidimensional concept for which there is no common definition. In mental health research, quality of life may refer to health status, physical functioning, perceived health status, subjective health, health perceptions, symptoms, needs satisfaction, individual cognition, functional disability, psychiatric disturbance, well-being and often several of these at the same time. In this thesis, quality of life is defined as proposed by the World Health Organization:

*“An individuals' perception of their position in life in the context of the culture and value system in which they live and in relation to their goals, expectations, standards and concerns.”*

Despite the lack of a common definition, there are two fairly well-established types of quality of life: generic quality of life and health-related quality of life. Generic quality of life focuses on an individual's needs and goals and an estimation of how that individual is managing relative to both internal and external standards (Quilty et al., 2003). This general concept of quality of life

concerns itself with subjective satisfaction and functioning across a number of life domains not necessarily directly affected by a mental health diagnosis and/or its consequent treatment (Quilty et al., 2003). In contrast, health-related quality of life focuses solely on the functional effect of a diagnosis and/or its consequent treatment on an individual's subjective satisfaction and functioning (Quilty et al., 2003).

In mental health research both types of quality of life are used. However, Quilty et al. (2003) wrote that health related quality of life is less appropriate for use in mental health research, as psychopathology can affect most aspects of life and therefore the inclusion of broad environmental factors, such as social support and independence, are fundamental to assessing quality of life in adults with mental illness.

## 2.1.2 Measurement

### 2.1.2.1 Instruments

Several instruments have been developed and validated for use in adults with mental illness (Atkinson and Zibin, 1996; Ishak et al., 2011; Bobes et al., 2005; Madhav, Namjoshi and Buesching, 2001). These instruments can be divided into two categories:

1. **Generic measures:** the World Health Organization Quality of Life Assessment, the Medical Outcome Study 36-item Short Form Health Survey, the European Quality of Life Index, the Quality of Life Enjoyment and Satisfaction Questionnaire, the Quality of Life Inventory, the Nottingham Health Profile, the Sickness Impact Profile, and the Psychological General Well Being Scale.
2. **Disease specific measures:** the Quality of Life Scale, the Quality of Life Interview, the Lancashire Quality of Life Profile, the Quality of Life in Depression Scale, the Quality of Life Index for Mental Health, the Quality of Life Questionnaire in Schizophrenia, and the Satisfaction with Life Scale.

Generic instruments are designed to measure the general quality of life of an individual. They can be used to assess quality of life in the general population, as well as in patients with illness.

Disease specific measures in contrast, are designed to measure quality of life in patients with a specific disease. These measures limit their assessment of quality of life to dimensions of relevance to the disease for which they were developed. Instrument descriptions and psychometric properties are presented in Table 1 & 2.

Among the disease specific measures listed above three were designed for use in schizophrenic populations (the Lancashire Quality of Life Profile, the Quality of Life Scale, and the Quality of Life Questionnaire in Schizophrenia), two for use in depressed populations (the Satisfaction with Life Scale and the Quality of Life in Depression Scale) and two for use in mixed mental health diagnostic categories (the Lehman Quality of Life Interview and the Quality of Life Index for Mental Health) (See Table 1 & 2).

While generic measures are necessary to compare quality of life across different populations, it is preferable to use disease specific measures in mental health research, as they can be highly sensitive to detect and quantify small changes of importance to adults with mental illness.

**Table 1: Generic quality of life measures.**

<b>Instrument</b>	<b>Authorship</b>	<b>Description</b>	<b>Reliability/Validity</b>
World Health Organizations Quality of Life Measure (WHOQOL) (Bobes et al., 2005; Orsel, Akdemnir, & Dag, 2004).	Developed in 1996 by the World Health Organization WHOQOL Group.	Interviewer or self-administered subjective instrument measuring 6 domains: (1) physical health, (2) psychological health, (3) social relationships, (4) environment, (5) independence, and (6) spirituality.  Long form includes 100 items; short form developed in 1998 includes 28 items.	Cronbach's alpha for the total scale of 0.94 and coefficients for the 6 scales ranging from 0.67 to 0.87.
36-Item Short Form Health Survey (SF-36) (Bobes et al., 2005).  SF-20 abbreviated version developed in 1992.  SF-12 is an abbreviated form.	Developed in 1992 by Ware & Sherbourne.	Interviewer or self-administrated instrument. One multi-item scale that assesses 8 concepts: (1) limitations in physical activities because of health problems, (2) limitations in social activities because of physical or emotional problems, (3) limitations in usual role activities because of physical health problems, (4) bodily pain, (5) general mental health (psychological distress and well-being), (6) limitations in usual role activities because of emotional problems, (7) vitality (energy and fatigue), and (8) general health perceptions.	Cronbach's alpha ranges from 0.71 to 0.89.
EuroQol (EQ-5D) (Bobes et al., 2005; Prieto et al., 2003).	Developed in 1990 by the EuroQol Group.	Self-administered instrument for measuring health and health related quality of life in patients. It is a 2-part measure. Part 1 consists of 5 questions that cover: (1) mobility, (2) self-care, (3) usual activities, (4) pain or discomfort, and (5) anxiety and depression. In part 2, respondents rank their health from 0 to 100 with higher values indicating better health.	Cronbach's alpha 0.70.
Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q) (Atkinson & Zibin, 1996; Endicott, Nee, Harrison, & Blumenthal, 1993).	Developed in 1993 by Endicott, Nee, Harrison & Blumenthal.	Self-administered measure in 8 domains: (1) physical health, (2) feelings, (3) leisure, (4) social relations, (5) work, (6) home, (7) school, and (8) overall quality of life.  Long form includes 60 items and 5 subscales; short form includes 16 items.	Cronbach's alpha of 0.9 to 0.93.

<b>Instrument</b>	<b>Authorship</b>	<b>Description</b>	<b>Reliability/Validity</b>
Quality of Life Inventory (Atkinson & Zibin, 1996; Frisch et al., 2005)	Developed in 1992 by Frisch et al.	Interviewer or self-administered 17 item instrument that assesses an individual's satisfaction in particular areas of life that they deem important (e.g. health, self-regard, relationship, work).	Cronbach's alpha of 0.79.
Nottingham Health Profile (Hunt & McEwan, 1980; Hunt, McEwan & McKenna, 1985)	Developed in 1980 by Hunt & McEwan.	Self-administered two part questionnaire. Part 1 includes 38 items with 6 subareas (1) energy level, (2) pain, (3) emotional reaction, (4) sleep, (5) social isolation, (6) physical abilities. Part 2 reviews life areas affected with 7 areas: (1) work, (2) looking after the home, (3) social life, (4) home life, (5) sex life, (6) interests/ hobbies, (7) vacations. Scores range from 0 – 100.	Cronbach's alpha of 0.8.
Sickness Impact Profile (Bergner, Bobbitt, Carter & Gilson., 1981; Bergner, M., Bobbitt, Pollard, Martin & Gilson 1976).	Developed in 1976 by Bergner, Bobbitt, Pollard, Martin & Gilson.	Self or interviewer administered 68 item measure with 3 domains (1) physical dimension; (2) psychological dimension; (3) social dimension. All items are dichotomous (Yes, No) and total scores range from 0 (best health) – 68 (worst health).	Cronbach's alpha of 0.92.
Psychological General Well-Being Scale (Grossi et al., 2006).	Developed in 1984 by Grossi et al.	The 2- item measure covers 5 domains: (1) anxiety, (2) positive well-being, (3) vitality, (4) general health, and (5) self-control.	Cronbach's alpha of 0.9.
Quality of Life Index (Atkinson & Zibin, 1996; Ferrans & Powers, 1985).	Developed in 1985 by Ferrans & Powers.	It covers 4 domains: (1) health and functioning, (2) socioeconomics, (3) psychological or spiritual wellness, and (4) family life.  The measure consists of 2 parts: (1) 6-point rating scale ranging from “very satisfied” to “very dissatisfied”, and (2) importance rating of each domain. Scores are determined but by rating in each domain weighted by importance.	Cronbach's alpha of 0.93.

**Table 2: Disease specific quality of life measures.**

<b>Instrument</b>	<b>Authorship</b>	<b>Description</b>	<b>Reliability/Validity</b>
Quality of Life Scale (Bobes et al., 2005; Heinrichs, Hanlon, & Carpenter, 1984).	Developed in 1984 by Heinrichs, Hanlon & Carpenter.	Interviewer administered 16-item instrument measuring 6 domains: (1) material and physical well-being, (2) relationships with other people, (3) social, community and civic activities, (4) personal development and fulfillment, (5) recreation, and (6) independence.	Cronbach's alpha ranging from 0.85 to 0.97.
Quality of Life Interview (QLI) (Bobes et al., 2005; Lehman, Postradio & Rachuba, 1993).	Developed in 1988 by Lehman, Postradio & Rachuba)	The 44-item measure covers 8 domains: (1) work status, (2) legal problems, (3) living situation, (4) finances, (5) leisure activities, (6) family relations, (7) social relations, and (8) personal safety. The instrument provides a global measure of quality of life.	Cronbach's alpha ranging from 0.86-0.85.
Lancashire Quality of Life Profile (Oliver, Huxley, Priebe & Kaiser, 1996)	Developed in 1996 by Oliver, Huxley, Priebe & Kaiser.	The 105-item instrument contains objective and subjective measures of 7 domains: (1) living situation, (2) daily activities, (3) family relations, (4) finances, (5) job, (6) safety, and (7) health. The instrument also measures: positive and negative affect, self-esteem, global well-being, perceived quality of life and quality of life of the patient independently of the patients own opinion.	Cronbach's alpha 0.75.
Quality of Life in Depression Scale (Atkinson & Zibin, 1996; McKenna & Hunt, 1992).	Developed in 1992 by McKenna & Hunt.	Self-administered 34-item measure that assesses the impact of depressive symptoms and treatment on quality of life.	Cronbach's alpha of 0.95.
Quality of Life Index for Mental Health (Atkinson & Zibin, 1996; Becker, Diamond, & Sainfort, 1993).	Developed in 1993 by Becker & Diamond.	113-item self-administered instrument including subjective and objective measures of 9 domains: (1) satisfaction with life, (2) occupational activities, (3) psychological well-being, (4) physical health, (5) social relations, (6) economics, (7) activities of daily living, (8) symptoms, and (9) goal attainment.	Cronbach's alpha ranging from 0.68 to 0.91.

<b>Instrument</b>	<b>Authorship</b>	<b>Description</b>	<b>Reliability/Validity</b>
Quality of Life Questionnaire in Schizophrenia (Bobes et al., 2005; Auquier et al., 2003).	Developed in 2003 by Auquier et al.	Self-administered 41-item measure of health related quality of life with 8 subscales: (1) psychological well-being, (2) self-esteem, (3) family relationship, (4) relationship with friends, (5) resilience, (6) physical well-being, (7) autonomy, and (8) sentimental life.	Cronbach's alpha of at least 0.7 for all domains (ranging from 0.72 to 0.92).
Satisfaction with Life Scale (Diener, Emmons, Larsen & Griffin, 1985; Pavot, Diener, Colvin, & Sandvik, 1991).	Developed in 1985 by Diener, Emmons, Larsen, & Griffin.	5 item global measure of satisfaction with life. Interviewer or self-administered.	Cronbach's alpha of 0.84.



### 2.1.2.2 Instrument Selection

The choice of instrument depends upon the intended application and the nature of the outcome information desired. For example, a generic instrument may be selected if the intended application is to compare quality of life across different populations or interventions. In contrast, a disease specific instrument may be chosen in the assessment of individual patient care, as they are intended to quantify small changes of importance within specific diagnostic categories.

Method of administration, interview or survey, may also influence instrument selection. Quality of life instruments administered through interviews are resource intensive and therefore more expensive. However, they may improve data quality and reduce measurement error due to recall bias, processing errors, non-response and respondent bias. In contrast, instruments administered by survey are less expensive and may be conveniently managed. However, they are subject to low response rates, which may influence the generalizability of findings. Among the instruments listed above twelve are administered by survey, five are administered through interview and one can be administered by either survey or interview (See Tables 1 & 2).

Instrument selection may also be influenced by the number and type of domains used to assess quality of life. According to Atkinson and Zibin (1996), a well-rounded instrument should assess at least five domains and include assessment of biological, psychological, interpersonal, social and economic experience. Among the instruments included in this review, the number of domains assessed ranged from one, the Satisfaction with Life Scale to ten, the Quality of Life Inventory. The most frequently used domains were: health, social relations, leisure, community productivity, and self-esteem/ well-being and the less frequently used domains were: family, living situation, finances, psychiatric symptoms and religion (See Tables 1 & 2).

Finally, whether or not quality of life is assessed through self or observer-based ratings, may influence instrument selection. Among the instruments included in this review, seven were self-rated only and eleven included both self and observer-based ratings (See Tables 1 & 2). Self-rated only instruments are based on the Satisfaction Model of quality of life. In contrast instruments that include both self and observer-based ratings are based on the Three Component

Model and assess quality of life through an individual's appraisal of life satisfaction and through evaluation of functioning and social-material conditions.

### 2.1.2.3 Challenges to Quality of Life Measurement in Mental Health Research

In mental health research there are a number of challenges to measuring quality of life. Arguably, the greatest challenge is the lack of common definition or measuring standard. In mental health research, quality of life may refer to health status, physical functioning, perceived health status, subjective health, health perceptions, symptoms, needs satisfaction, individual cognition, functional disability, psychiatric disturbance, well-being and often several of these at the same time. As such, there are a number of instruments used to measure quality of life in mental health research. These instruments range from assessments of functional capacity to complex questionnaires assessing social activities and psychological problems with the number and type of domains included varying between instruments.

In addition to the lack of common definition or measuring standard, as quality of life is an inherently subjective or self-rated concept differences in personal characteristics, experiences, expectations, preferences, value systems and cultures affect an individual's assessment of their quality of life. In mental health research an additional challenge to the measurement of quality of life is the influence of psychopathology on an individual's ability to make valid and reliable assessments of their well-being/life satisfaction.

Katsching (2006) reported that quality of life measurement could be biased in adults with mental illness due to altered psychological states or psychopathological fallacies. Psychopathological fallacies include affective fallacy, cognitive fallacy and reality distortion fallacy. Affective fallacy is when an individual uses their momentary affective state as information to make judgments of life satisfaction. For example, a depressed individual typically rates their satisfaction, functioning and social-material conditions as worse than they appear to an independent observer, whereas a manic individual typically rates their well-being, functioning and social-material conditions more favorably. Cognitive fallacy occurs when an individual is

unable to assess intellectually their life situation and reality distortion fallacy occurs when delusions and hallucinations distort an individual's perception of their life satisfaction, functioning and social-material conditions.

#### 2.1.2.4 Conclusion

There are a number of definitions and measures of quality of life used in mental health research. However, in reviewing the literature, it is recommended that quality of life be conceptualized in general terms, as opposed to health-related quality of life, and to use disease specific measures as they may be able to detect small changes of importance and to be cognizant of the challenges to measuring quality of life in adults with mental illness.

## 2.2 Quality of Life in Adults with Mental Illness

Although mental illness takes many forms, only literature in those with mood disorders, schizophrenia and anxiety disorders (excluding posttraumatic stress disorder) were included in the literature review for this thesis. As such, the literature relating to quality of life among those with substance-related and addictive disorders, eating disorders, disordered personality, as well as illnesses related to specific populations such as children, the elderly and individuals with developmental delay was not reviewed. Search strategies are presented in Appendix 1.

### 2.2.1 Literature Assessing Quality of Life in Adults with Mental Illness

#### 2.2.1.1 Mood Disorders

##### 2.2.1.1.1 Major Depressive Disorder

Ishak et al. (2011) in their review from 1984 to 2010 reported that those with depression experience lower physical, role and emotional functioning and long-lasting decrements in psychosocial functioning in comparison to the general population. In addition, the authors also reported that overall quality of life was significantly lower in adults with major depressive disorder when compared to the general population and lower than or comparable to those with chronic physical conditions including hypertension, cancer and chronic pain (Ishak et al., 2011).

In a recent study conducted in Turkey, Aydemir, Ergun, Soygur, Kesebir & Tulunay (2009), assessed quality of life in 74 patients diagnosed with major depressive disorder using the SF-36 and the EQ-5D. The authors found that patients with major depressive disorder scored significantly lower on all domains of the SF-36 in comparison to Turkish general population norms.

In one of the largest studies to date, Wells et al. (1989) assessed and compared quality of life, using the SF-36, in 11, 242 adult outpatients who had a diagnosis of either depression (major depressive disorder or depressive symptoms) or a chronic physical condition including hypertension, diabetes, arthritis or advanced heart disease and healthy controls from three study sites in the United States of America: Boston, Chicago and Los Angeles. The authors found that those with depression regardless of severity had worse physical, social and role functioning as well as perceived current health and greater bodily pain than the healthy controls but comparable impairments to those with a chronic physical condition.

In another study conducted in Argentina, Bonicatto et al. (2001) assessed quality of life in 48 adults with major depressive disorder, 96 population controls and 181 patients with chronic physical conditions including hypertension (n=50), breast cancer (n=44) and chronic back pain (n=87) using the WHOQOL-100 and BREF version. The authors found that those with major depressive disorder had significantly lower quality of life in comparison to both the healthy controls and those with chronic physical conditions. In particular, the association between major depressive disorder and lower quality of life was statistically significant in all life domains measured by the WHOQOL except physical safety, financial resources and access to transportation.

In addition to the cross-sectional studies assessing quality of life in adults with depression, Hays et al. (1995) conducted a longitudinal study assessing the impact of major depressive disorder on quality of life using 1,790 participants with depression, diabetes, hypertension, recent myocardial infarction, and/or congestive heart failure over a two-year period from three study sites in the United States: Boston, Chicago and Los Angeles. The authors administered the SF-36 at two time points, baseline and two years later. The authors found that although the limitations to functioning and well-being improved for depressed patients between baseline and follow-up, these limitations were similar to or worse than those among those with chronic physical conditions. As such, the authors concluded that depression, regardless of severity, was associated with substantial and long-lasting impairment in multiple domains of functioning and well-being comparable to or greater than those with chronic physical conditions.

#### 2.2.1.1.2 Bipolar Disorder

Madhav, Buesching, Namjoshi & Don (2001) in a review of the literature assessing quality of life in adults with bipolar disorder from 1966 to 1998 and Ishak et al. (2012) in their recent review of studies published from 1959 to 2010 reported that bipolar disorder is associated with significant impairments in physical, social and role functioning and overall health perception even when in the stable stage of the disorder. In addition, the authors reported that quality of life in adults with bipolar disorder is significantly lower than that of the general population (Madhav, Buesching, Namjoshi & Don 2001; Ishak et al., 2012).

In one study, Sierra, Livianos & Rojo (2005) assessed the quality of life in 50 adult outpatients living in Spain with bipolar disorder using the SF-36. The authors found that patients with bipolar disorder had statistically significantly lower scores in all domains of the SF-36 when compared to the general population, even when in the stable phase of the disorder. Gutierrez-Rojas et al. (2008) using the SF-36 to assess quality of life in 108 adult outpatients with bipolar disorder and 1, 200 general population controls living in Jaen, Spain, later confirmed these findings by reporting that those with bipolar disorder scored statistically significantly lower in physical and mental quality of life than the general population. Goossens, Hartong, Knoppert-van der Klein & van Achterberg (2008) also confirmed lowered quality of life in adults with

bipolar disorder in comparison to the general population; however the authors used a different measure, the WHOQOL-BREF.

Arnold, Witzeman, Swank, McElroy & Keck (2000) compared quality of life in adults living in Ohio, United States, with bipolar disorder (n=44) to those with chronic back pain (n=30) using the SF-36. The authors found that those with bipolar disorder had statistically significant lower scores on all scales of the SF-36 except physical functioning. In addition, the authors reported that quality of life in adults with bipolar disorder was greater in the areas of physical and social functioning than in those with chronic back pain; however, there was no statistically significant difference in impairment in the area of mental health between the two groups.

#### 2.2.1.1.3 Limitations of the Literature Assessing Quality of Life in Adults with Mood Disorders

Among studies assessing quality of life in adults with major depressive disorder there were a number of limitations. First, even though there validated disease specific measures for use in this population, studies included in this review use generic measures. Second, most of the studies included in this review are cross-sectional. As depressive symptomology can change and an individual may achieve recovery or remission over the course of the disorder, it is important to understand quality of life over time and in all phases of the disorder. Third, as all study samples are treatment-seeking outpatients, and most samples included those diagnosed with major depressive disorder the existing literature may not be generalizable to those with less severe depression. Finally, some authors report on domain specific quality of life while other report overall quality of life scores making cross study comparisons difficult.

Among studies assessing quality of life in adults with bipolar disorder there were a number of limitations. First, the sample sizes of studies included in this review are relatively small and therefore may not be adequately powered to detect statistical significance. Second, there is no validated disease specific measure of quality of life in this population and therefore no one-way to assess quality of life in all phases of bipolar disorder. Third, all studies included in the literature review were cross-sectional in design. As bipolar disorder is a chronic illness during

which individual's may have multiple episodes of mania and depression, it is important to understand quality of life over time and in all phases of the disorder. Finally, as with the major depressive disorder literature, some authors report domain specific quality of life and other overall quality of life scores.

### 2.2.1.2 Schizophrenia

Most of the studies included in this review were longitudinal, however in a recent cross-sectional study, Xiang et al., (2012) assessed quality of life in 540 community dwelling adults with schizophrenia living in Beijing, using the WHOQOL-BREF. The authors found that those with schizophrenia had significantly lower scores in the physical and psychological domains when compared to the general Chinese population.

In a 10-year longitudinal study, Skantze (1998) assessed quality of life in 40 adult outpatients with schizophrenia living in Sweden, using the QLS. The author reported low quality of life at baseline among adults with schizophrenia and that although participants experienced statistically significant improvements to quality of life in the life domains of inner experiences, contacts and knowledge and education, overall quality of life remained unchanged after 10 years.

In another longitudinal study, Gorna, Jaracz, Rybakowski & Rybakowski (2008) also found no changes to overall quality of life over time. The authors assessed quality of life in 74 adult outpatients living in Poland with schizophrenia at 1 month, 1 year and 4 to 6 years after their first hospitalization using the WHOQOL-BREF. The authors found that at 1-month post hospitalization quality of life was low and that overall quality of life did not statistically significantly change overtime.

Finally, in a recently published longitudinal study, Cichocki et al. (2015) assessed quality of life in 52 adults living in Poland with schizophrenia at three time-points: 7, 12 and 20 years after first hospitalization, using the Lehman Quality of Life Questionnaire. The authors reported that quality of life was statistically significantly lower over time in the areas of family life, health, social relationships and finances between baseline and 20 years, however there were no changes

to overall quality of life. The authors contributed this decline in quality of life to deterioration in functioning and an absence of symptom remission.

#### 2.2.1.2.1 Limitations of the Literature Assessing Quality of Life in Adults with Schizophrenia

Among studies assessing quality of life in adults with schizophrenia there were a number of limitations. First, in studies assessing quality of life in adults with schizophrenia, the sample sizes are relatively small and may not be adequately powered to detect statistical significance. This may be due to selection bias or loss to follow up, as most studies are longitudinal. Second, a number of quality of life measures are used despite the fact that validated disease specific measures have been developed for adults with schizophrenia. Finally, as with the literature assessing quality of life in adults with mood disorders, some authors report domain specific quality of life while other report overall quality of life scores.

#### 2.2.1.3 Anxiety Disorders

The literature assessing quality of life among those with anxiety disorders is less extensive than that of quality of life in other mental illnesses. Nevertheless, Olatunji, Cisler & Tolin (2007) in their review of the literature assessing quality of life in adults with anxiety disorders in studies published between 1996 and 2007 reported that anxiety disorders are associated with significant impairments in quality of life and psychosocial functioning. Furthermore, Olatunji, Cisler & Tolin (2007) reported that quality of life in adults with anxiety disorders is significantly lower than in the healthy population regardless of the quality of life measure or type of anxiety disorder.



### 2.2.1.3.1 Obsessive Compulsive Disorder

Subramaniam et al. (2014), in their recent review of studies assessing quality of life in adults with obsessive-compulsive disorder, found that those with obsessive-compulsive disorder have statistically significant functional disability and lower quality of life in comparison to the general population.

A number of studies have assessed quality of life using the SF-36 in comparison to general population norms, or healthy controls and have found that quality of life in adults with obsessive compulsive disorder is significantly lower (Fontenelle et al., 2010; Rodriguez-Salgado et al., 2006; Bobes et al., 2001; Koran, Thienemann, & Davenport, 1996 ). In the largest study to date, Rodriguez-Salgado et al. (2006) assessed quality of life in 64 patients with moderate to severe obsessive-compulsive disorder using the SF-36 and 9,151 general population controls from Spain and found that those with obsessive compulsive disorder had lower quality of life for all subscales of the SF-36 except those related to physical health and pain in comparison to the general population.

Kivircik et al. (2005), using the Quality of Life Scale, also reported statistically significant lower quality of life in adults living in Turkey with obsessive compulsive disorder in comparison to the general population. In a more recent study, Huppert et al. (2009) assessed quality of life in 66 adults with obsessive-compulsive disorder, and 36 matched healthy controls using the Q-LES-Q and the SF-36 from six sites in Philadelphia, United States. The authors confirmed previous findings, reporting that obsessive-compulsive disorder was associated with significantly lower quality of life in comparison to healthy controls. The authors also reported that those with obsessive-compulsive disorder experienced functional impairment in the areas of work, social life, and family life.

### 2.2.1.3.2 Panic Disorder

In a review of studies assessing quality of life in adults with panic disorders published between 1980 to 2010, Davidoff, Christensen, Khalili, Nguyen & Ishak (2011), reported that those with

panic disorder experience substantial impairments to quality of life in comparison to healthy controls (Ettigi et al, 1997; Candilis et al., 1999; Eguchi et al., 2005; Carrera et al., 2006) and greater than or comparable impairments to those with chronic physical conditions (Sherbourne, Wells & Judd, 1996).

Ettigi et al. (1997) assessed quality of life in 84 adults with panic disorder accessing outpatient mental health service in the United States using the SF-36. The authors reported that quality of life scores were significantly lower than age and sex-adjusted population norms in every domain of the SF-36. More recently, Candilis et al. (1999), Eguchi et al. (2005) and Carrera et al. (2006) all using the SF-36, reported similar findings to Ettigi et al (1997) in their assessments of quality of life in outpatients with panic disorder and general population norms.

In comparison to populations with chronic physical conditions, Sherbourne, Wells and Judd (1996) assessed quality of life using the SF-36 and SF-20 in 433 patients with panic disorder living in California, United States, and 9, 839 outpatients with one of the following chronic physical conditions: hypertension, diabetes, heart disease, arthritis, chronic lung problems. The authors reported that those with panic disorder had levels of mental health and role functioning that were significantly lower than those of patients with chronic physical illnesses.

### 2.2.1.3.3 Social Anxiety Disorder

There was relatively little literature assessing quality of life in adults with social anxiety disorder. However, this literature review identified two studies. Wittchen et al. (2000) compared quality of life in 65 adults with social anxiety disorder living in Germany to general population controls using the SF-36. The authors reported that those with social phobia experienced lower quality of life in comparison to the general population with statistical significance in the areas of work performance and social relationships. In a more recent study, Pallanti et al. (2008) confirmed the findings of Wittchen et al. (2000) using the Q-LES-Q in their assessment of quality of life. The authors investigated quality of life in 41 outpatients with social anxiety disorder and 100 healthy controls in Italy and reported that those with social anxiety disorder experienced lower quality of life than controls in all subscales of the Q-LES-Q.

#### 2.2.1.3.4 Generalized Anxiety Disorder

As with the literature assessing quality of life in adults with social phobia, relatively few studies have assessed quality of life in adults with generalized anxiety disorder. In fact, this literature search only identified one relevant study to be included in this review. This may be due to the fact that generalized anxiety disorder rarely occurs in isolation (Quilty et al., 2003).

Nevertheless, Henning et al. (2007) assessed quality of life in 52 adults with generalized anxiety disorder and 55 healthy controls using the QOLI in Philadelphia, United States. The authors reported that quality of life was lower in adults with general anxiety disorder in comparison to healthy controls in the areas of self-esteem, goals and values, money, work, play, learning, creativity, friends and relatives.

#### 2.2.1.3.5 Limitations of the Literature Assessing Quality of Life in Adults with Anxiety Disorders

Among studies assessing quality of life in adults with anxiety there were a number of limitations. First, relatively few studies have assessed quality of life in this population. Furthermore, panic disorder and obsessive compulsive disorder seem to be reasonably studied while others have been largely neglected. Second, the sample sizes were relatively small and may not be adequately powered to detect statistical significance. Finally, as with the literature on mood disorders and schizophrenia, some authors report domain specific quality of life while others report overall quality of life scores.

#### 2.2.1.4 Conclusion

In reviewing the literature, it is evident that regardless of the measure used or the diagnostic group, adults with mental illness experience lower quality of life in comparison to the general population and to those with some chronic physical illnesses including but not limited to:

hypertension, cancer, chronic back pain, diabetes, heart disease, arthritis and chronic lung problems.

## 2.2.2 Determinants of Quality of Life in Adults with Mental Illness

### 2.2.2.1 Living Arrangement

Living arrangement is often conceptualized as household composition. Individuals with mental illness can either live alone, with family or with unrelated persons. Living arrangement influences an individual's immediate availability of resources, whether they are financial, material or social, and may be a predictor of quality of life in adults with mental illness (Joutsenniemi et al., 2006).

#### 2.2.2.1.1 Literature Investigating the Relationship between Quality of Life and Living Arrangement in Adults with Mental Illness

The literature search did not identify any studies assessing the relationship between living arrangement and quality of life in adults with mental illness; however, it did identify a few studies suggesting that living arrangement is an important predictor of quality of life in older adults (65 years and older).

In one study, Kharicha et al. (2007) evaluated the relationship between quality of life and living arrangement in 2,641 community dwelling non-disabled older adults living in the United Kingdom using the EQ-5D. The authors reported that those who live alone experience statistically significantly lower quality of life than those who live with others. Sun, Lucas, Meng & Zhang (2010) confirmed the findings of Kharicha et al. (2007). The authors also evaluated the relationship between quality of life and living arrangement using the EQ-5D in a sample of 9,711 older adults living in China and reported that quality of life in older adults who live alone was statistically significantly lower than those who live with family (Sun, Lucas, Meng &

Zhang, 2010). Finally, in a recent study, Henning-Smith (2014) evaluated the relationship between quality of life and living arrangement in 4, 862 non-institutionalized older adults living in the United States using data from the United States National Health Survey. The author reported that quality of life in older adults who live alone or with others is statistically significantly lower than among those who live with a spouse.

#### 2.2.2.2 Social Support

Social support can be defined in various ways. It may be defined to include structural aspects such as, quantity of social relationships; and functional or qualitative aspects such as type of interactions with other people and satisfaction with social and emotional relationships (Barrera, 1986; Gottlieb & Bergen, 2009).

There are three broad categories of social support represented in the literature: social connectedness or social embeddedness, perceived social support, and actual or enacted social support (Barrera, 1986; Gottlieb & Bergen, 2009). The concept of social connectedness or social embeddedness refers to an individual's quantity and quality of social relationships (Simon et al, 2002; Kaul & Lakey, 2003). These social relationships may be: informal relationships including family members, friends and neighbours; or formal relationships including mental health professionals, physicians, counselors, teachers and others (Kaul & Lakey, 2003). The concept of social connectedness or social embeddedness considers: structural aspects, such as the number of sources of social support; and functional aspects, or qualitative nature of an individual's social relationships (Barrera, 1986). The concept of perceived social support refers to an individual's appraisal of the availability and/or adequacy of social support regardless of receipt (Barrera, 1986). Finally, the concept of actual or received social support refers to an individual's report of the support they have actually received (Barrera, 1986).

There are a variety of instruments used to assess social support. Instruments can be self-administered or interviewer lead and range from single items used to assess whether or not social

support is available to more extensive instruments that include multiple items asking about various types of supports. Table 3 lists and describes instruments used to measure social support.

Most of the instruments are measures of perceived social support (MOS Social Support Survey, Lubben Social Network Scale, ENRICH Social Support Inventory, Multidimensional Scale of Perceived Social Support, Interpersonal Support Evaluation List, Interview Schedule for Social Interaction, Social Support Questionnaire, Personal Resource Questionnaire and the Social Provisions Scale), one instrument measures social connectedness (Duke-UNC Functional Social Support Questionnaire), and one instrument measures actual or received social support (Inventory of Socially Supportive Behaviours).

**Table 3: Social support instruments.**

<b>Instrument</b>	<b>Authorship</b>	<b>Objective</b>	<b>Domains</b>	<b>Number of items</b>	<b>Notes</b>
MOS Social Support Survey (Gottlieb & Bergen, 2009; Sherbourne & Stewart, 1991).	Developed in 1991 by Sherbourne & Stewart.	Assess dimensions of social support.	4 subscales: (1) emotional/information support; (2) tangible support; (3) affectionate support; (4) positive social interaction.	Long form includes 19 items and short form includes 12 items	Captures differences in the types of perceived social support.
Lubben Social Network Scale (Gottlieb & Bergen, 2009; Lubben et al., 2006).	Developed in 1988 by Lubben et al.	To assess social isolation by measuring perceived social support received from family and friends.	Overall social support.	Initial version includes 12 items; the short form includes 6 items; and the expanded version includes 18 items	
ENRICHD Social Support Inventory (Gottlieb & Bergen, 2009; Vaglio et al., 2004).	Developed in 2000 by Vaglio et al.	Assess dimensions of social support.	4 areas of social support: (1) emotional, (2) instrumental, (3) informational, and (4) appraisal.	7 items	
Multidimensional Scale of Perceived Social Support (MSPSS) (Gottlieb & Bergen, 2009; Zimet & Farley, 1988).	Developed in 1988 by Zimet & Farley.	To assess perceptions of support from family, friends or significant others.	Overall social support.	12 items	Captures variability in the 3 major sources of support.

<b>Instrument</b>	<b>Authorship</b>	<b>Objective</b>	<b>Domains</b>	<b>Number of items</b>	<b>Notes</b>
Interpersonal Support Evaluation List (Gottlieb & Bergen, 2009; Cohen, Underwood, & Gottlieb, 2000)	Developed by Cohen & Hoberan in 1983.	Index of perceived social support.	4 subscales: (1) tangible support; (2) belonging support; (3) self-esteem support; and (4) appraisal support.	40 items	
Interview Schedule for Social Interaction (Gottlieb & Bergen, 2009; Henderson, Duncon-Jones, Byrne, & Scott, 1980).	Developed in 1980 by Henderson, Duncon-Janes, Byrne, & Scott.	To assess the availability and supportive quality of social relationships.	2 domains (1) the availability of close and emotionally intimate relationships and their adequacy, (2) the availability of more diffuse relationships and friendships that provide social integration, and the adequacy of these relationships.	50 items	Administered by an expert and used only in psychiatric patients.
Inventory of Socially Supportive Behaviours (Gottlieb & Bergen, 2009; Barrera & Baca, 1990).	Developed in 1981 by Barrera and Baca.	To assess how often individuals receive various forms of assistance.	6 functions of support: (1) material aid; (2) behavioural assistance; (3) intimate interaction; (4) guidance; (5) feedback; and (6) positive social interaction.	Long form 40 items; short form 19 items	
Social Support Questionnaire (Gottlieb & Bergen, 2009; Sarason, Levine, Basham, & Sarason, 1983).	Developed in 1983 by Sarason, Levine, Basham, & Sarason.	To assess perceptions of social support and satisfaction with that social support.	Each item involves two parts: respondents are asked to list the individuals that are available to them for help in specific situational circumstances, and how satisfied they are with the support available.	Long form 27 items; short form 6 items	Quantifies availability of and satisfaction with social support.



<b>Instrument</b>	<b>Authorship</b>	<b>Objective</b>	<b>Domains</b>	<b>Number of items</b>	<b>Notes</b>
Personal Resource Questionnaire (PRQ) (Gottlieb & Bergen, 2009; Weinert & Brandt, 1987).	Developed in 1987 by Weinert & Brandt.	Two part measure of social support.	Part 1 consists of life situations in which one might be expected to need some assistance. It provides descriptive information about the person's resources, whether or not they have experienced the situation in the past 6 months, and their satisfaction with these resources. Part 2 measures the respondent's level of perceived social support.	Part 1 includes 10 items and part 2 includes 25 item	Nursing measure of social support.
Social Provisions Scale (Gottlieb & Bergen, 2009; Cutrona & Russell, 1987).	Developed in 1987 by Cutrona & Russell.	Assess dimensions of social support.	6 dimensions: (1) guidance; (2) reliable alliance; (3) reassurances; (4) opportunity for nurturance; (5) attachments; and (6) social integration.	24 items	Captures variability in the types of perceived social support.
Duke-UNC Functional Social Support Questionnaire (Gottlieb & Bergen, 2009; Broadhead, Gehlbach, de Gruy, & Kaplan, 1988).	Developed in 1988 by Broadhead, Gehlbach, DeGruy & Kaplan.	Assess the amount and type of perceived emotional and social support.	2 dimensions: (1) confidant support; and (2) affective support.	8 items	Measures personal satisfaction with functional and affective aspects of social support.

### 2.2.2.2.1 Literature Investigating the Relationship between Quality of Life and Social Support in Adults with Mental Illness

This literature search identified a small number of studies investigating the relationship between quality of life and social support in adults with mental illness; nevertheless, there is evidence to suggest that social support or lack thereof is an important predictor of quality of life in adults with mental illness (Lam & Rosenheck, 2000; Hansson & Bjorkman, 2007; Ribas & Lam, 2010).

In a recent study, Ribas & Lam (2010) investigated the relationship between quality of life and social support in a smaller sample (N=60) of Latino adults with serious mental illness in Chicago, United States. Using the Lehman Quality of Life Interview and the Social Support Questionnaire, the authors reported that better quality of social support is associated with greater quality of life.

In a longitudinal study, Lam & Rosenhek (2000) investigated the relationship between quality of life and social support in 4, 331 homeless mentally ill clients (depression, schizophrenia, personality disorder, bipolar disorder and anxiety disorder not specified), from 18 sites across Canada, over a one-year period using the Lehman Quality of Life Interview and the Social Support Questionnaire. The authors reported that at baseline and follow up that social support was associated with greater quality of life.

In a more recent longitudinal study, Hansson & Bjorkman (2007) investigated the relationship between quality of life and social support using the Lancashire Quality of Life Profile and the Interview Schedule for Social Interaction, in adults with schizophrenia or schizoaffective disorder, in Sweden over a 6-year period. The authors reported that size of social network was a significant longitudinal predictor of quality of life in adults with serious mental illness.

#### 2.2.2.2.2 Limitations of the Literature Investigating the Relationship between Quality of Life and Social Support in Adults with Mental Illness

Among the literature investigating the relationship between quality of life and social support in adults with mental illness the following limitations were observed. First, relatively few studies have investigated the relationship between quality of life and social support in this population. Second, most of the samples included adults with schizophrenia, therefore limiting the generalizability of findings to those with other mental illnesses. Third, social support is not conceptualized or measured in the same way. Finally, as with most of the literature included in this review some authors report domain specific quality of life while others report overall quality of life scores.

#### 2.2.2.3 Demographic and Clinical Variables

Cross-sectional and comparative studies have identified a number of clinical determinants of quality of life in adults with mental illness. These factors include symptom severity, comorbid psychiatric and physical conditions, the number of psychiatric hospitalizations. This literature suggests that symptom severity and quality of life are negatively associated (Ishak et al., 2011; Hayhurst et al., 2006; Vojita et al., 2001; Narvaez et al., 2008; Huppert et al., 2001; Narvaez et al., 2008), quality of life is lower in those with comorbid psychiatric and physical conditions (Ishak et al., 2011; Evans, Huxley & Priebe, 2000; Cramer, Torgersen & Kringlen, 2005; Ruggeri et al., 2008), and quality of life and number of psychiatric hospitalizations are negatively associated (Browne et al., 1996; Ruggeri et al., 2008).

Demographic variables are less strongly correlated with quality of life in adults with mental illness than clinical variables. However, women show higher quality of life than men (Narvaez et al., 2008; Bobes et al., 2005; Pinikahana, Happell, Hope, & Keks, 2002; Ruggeri et al., 2005), age is negatively associated with quality of life (Bobes et al. 2005; Cooke, Robb, Young, & Joffe, 1996; Ruggeri et al., 2005; Mercier, Peladeau & Tempier, 1998), quality of life is greater

in those who are married compared to those who are not (Narvaez et al., 2008; Ruggeri et al., 2005), and quality of life is greater in those with higher income or who are employed (Lam & Rosenheck, 2000; Ruggeri et al., 2005; Caron et al., 1998).

#### 2.2.2.4 Conclusion

In reviewing the literature, it is evident that little is known about the relationship between quality of life and living arrangement in adults with mental illness. However, there is evidence of some statistically significant demographic, clinical and psychosocial factors that may influence quality of life in adults with mental illness.

## Chapter 3

### 3 Objectives and Hypotheses

The purpose of this thesis is to investigate the relationship between living arrangement and quality of life in a sample of community-dwelling adults with mental illness. Specifically, this thesis will evaluate the following objectives designed to address some knowledge gaps in the existing literature.

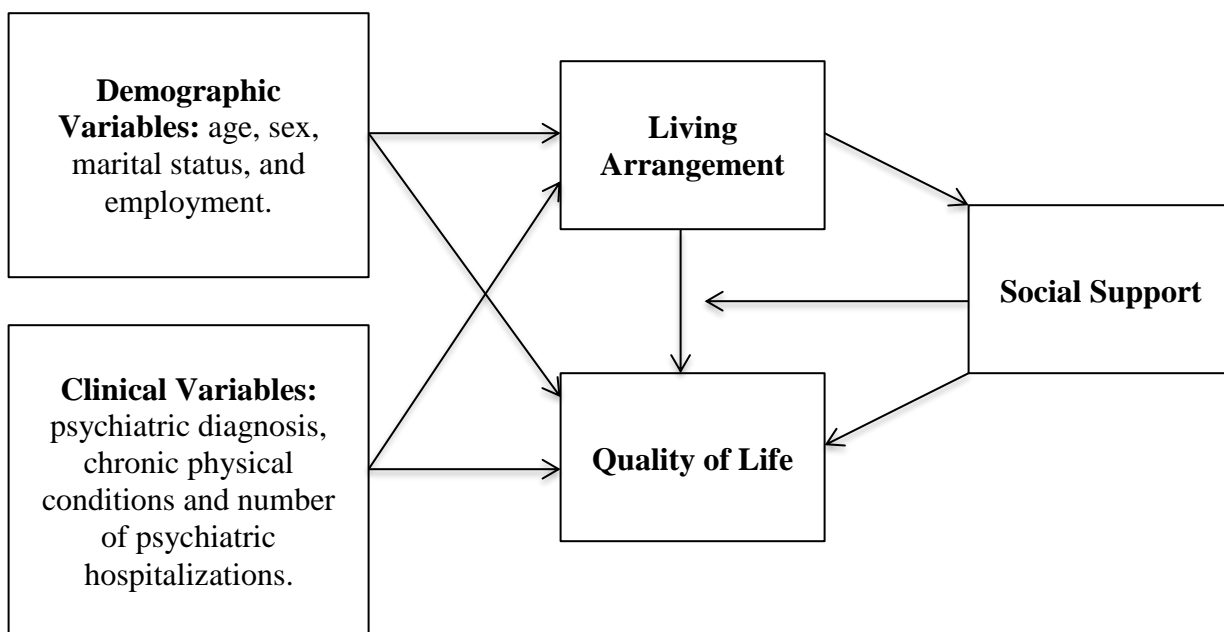
#### 3.1 Objective 1

The primary objective of this thesis is to estimate the statistical association between living arrangement and quality of life in a community dwelling sample of adults with mental illness. Demographic and clinical variables will also be included in the analysis to understand their effect on the relationship between quality of life and living arrangement. It is hypothesized that living arrangement has a direct impact on quality of life in adults with mental illness even after adjusting for demographic and clinical factors.

#### 3.2 Objective 2

Determine the extent to which social support impacts the association between living arrangement and quality of life in adults with mental illness. As living arrangement influences the availability of an individual's immediate social resources and patterns of everyday social interactions, it may also predict quality of life in adults with mental illness through corresponding differences in social support. Therefore, it is hypothesized that social support has indirect effects on the relationship between living arrangement and quality of life.

Figure 1: Conceptual Model



### 3.3 Contributions to the Literature

This thesis contributes to the existing literature as no study to date has examined the association between living arrangement and quality of life in adults with mental illness. Furthermore, this thesis employs a large, heterogeneous sample of community dwelling adults with mental illness.

## Chapter 4

### 4 Methods

The purpose of this chapter is to describe the methods used in this thesis in alignment with the objectives outlined in Chapter 3.

#### 4.1 Data Source

Data for this thesis were from a project entitled Poverty and Social Inclusion funded under the Community-University Research Alliance (CURA) program of the Social Sciences and Humanities Research Council. The purpose of this CURA was to examine the relationship between poverty and social inclusion in adults with mental illness. This was a five-year longitudinal study that began in 2011 and will be complete in 2016. Research ethics approval was received from Western University's Research Ethics Board in April 2011 (See Appendix 2) and explicitly includes consent for secondary analyses.

#### 4.2 Study Population

The Poverty and Social Inclusion project included a community-based convenience sample of 380 individuals with mental illness from the London, Ontario, Canada and surrounding area. Participants were identified using public advertising, and outreach recruitment in community agencies and public places. The inclusion criteria were: (1) a diagnosis of any mental illness at any age, with duration of at least one year at the time of recruitment; (2) age 18 years or older; (3) ability to provide written consent; and (4) community-dwelling. There were no exclusion criteria.

Quota sampling was employed and there were four groups: (1) group homes, (2) homeless, (3) housed and employed, and (4) housed and unemployed. Homeless individuals were over-sampled in the first year to account for potential loss to follow up.

This thesis included only those from the original Poverty and Social Inclusion sample with complete data for all study variables. As such, the sample for this thesis included 294 of the original 380 participants.

### 4.3 Data Collection

The Poverty and Social Inclusion project was a mixed methods study including: (1) qualitative instruments, open-ended questions during structured interviews and focus groups; and (2) quantitative instruments administered during structured interviews. Quantitative instruments include: Demographics Form; Community Integration Questionnaire; Consumer Housing Preference Survey; Employment History Survey; EQ-5D Health Questionnaire; Health, Social, Justice Service Use Questionnaire; Housing History Survey; QLI; PRQ; SF-36 Health Survey; Socially Valued Role Classification Scale; The Stigma Scale; and a Modified National Population Health Survey.

### 4.4 Study Design

The current analysis used data from year one (2011) of the Poverty and Social Inclusion project. As such, it is cross-sectional in design.

### 4.5 Measures

The analysis for this thesis used the following subset of quantitative measures: QLI, Demographics Form and PRQ. Table 4 lists the variables included in this thesis.



### 4.5.1 Quality of Life

In this thesis, quality of life is measured using the QLI. The QLI is a validated measure of quality of life (Cohen, 1992). As discussed in Chapter 2, the QLI is a disease specific measure of quality of life that includes 44-items based on eight life domains: (1) living situation, (2) daily activities and functioning, (3) family relations, (4) social relations, (5) finances, (6) work/school, (7) legal/safety issues, and (8) health (Lehman, Kernan, & Postradio, 1994). Each item is scored on a 7 point Likert scale and overall quality of life scores range from 1 to 7 (Lehman, Kernan, & Postradio, 1994). Higher scores indicate greater quality of life (Lehman, Kernan, & Postradio, 1994). Cronbach's alpha for the QLI in adults with mental illness range from 0.56 to 0.87 (Lehman, Kernan, & Postradio, 1994). The Cronbach's alpha was calculated in this thesis and the QLI was found to be reliable (44-items;  $\alpha=0.74$ ).

### 4.5.2 Living Arrangement

The operational definition of living arrangement is adapted from Statistics Canada's definition of household living arrangement (Statistics Canada, 2012). Specifically, living arrangement was derived from the Demographics Form question: *What is your current living arrangement? Live with parent(s), live with spouse/partner, live with other relative, live alone, live with an unrelated person, inpatient, other*. Living arrangement is coded as lives alone, lives with family or lives with unrelated persons.

### 4.5.3 Social Support

Social support was measured using the PRQ. All data were self-reported. The PRQ measures self-reported social support characteristics of individuals. The Poverty and Social Inclusion Project used only part 2 of the PRQ. Part 2, is a 25-item scale that measures an individual's perceived level of social support based on five dimensions: (1) worth, (2) social integration, (3) intimacy, (4) nurturance, and (5) assistance (Brandt & Weinert, 1994; Tawalbeh & Ahmad,

2013). Each of the 25-items are scored on a 7 point Likert scale and total scores range from 25 to 17 (Brandt & Weinert, 1994). Higher scores indicate higher levels of perceived social support (Brandt & Weinert, 1994). The internal validity of the PRQ has been well documented with Cronbach's alphas ranging from 0.87 to 0.93 (Tawalbeh & Ahmad, 2013).

The QLI includes social relations and family domains in its assessment of quality of life. It measures social connectedness and asks the respondent to report how often they saw or spoke with members of their family or friends, as well as how they feel about their overall relationships with family members and the people they see socially. For example, *In the past year, how often did you talk to a member of your family on the telephone? Would you say at least once a day, at least once a week, at least once a month, less than once of month but at least once during the year, or not at all?*

This differs from the social support measured using the PRQ. The PRQ, as mentioned above, is a measure of perceived support and it asks respondents to report whether they agree or disagree with statements about the availability and/or adequacy of social support regardless of receipt. For example, *There is someone I feel close to who makes me feel secure (Strongly Disagree, Disagree, Somewhat Disagree, Neutral, Somewhat Agree, Agree, Strongly Agree).*

#### 4.5.4 Demographic Variables

Demographic variables included: age; sex; marital status; and employment status. All data were self-reported and derived from the Demographics Form.

In this thesis: age is a continuous variable with values of 18 years and older; sex is coded male or female; marital status is coded into three categories: single/ never married, separated/ divorced/ widowed and married/ common law; and employment status is coded as currently employed or not currently employed.

### 4.5.5 Clinical Variables

Clinical variables included: psychiatric diagnosis, number of psychiatric hospitalization and chronic physical conditions. All data were self-reported and derived from the Demographics Form.

Psychiatric diagnoses were coded into three categories: mood disorders, schizophrenia and anxiety disorders. Number of psychiatric hospitalizations was derived from the Demographics Form question: *Have you ever had a psychiatric hospitalization? (Yes, No). If yes, what is your estimated total number of psychiatric hospitalizations?* This variable was continuous. Finally, the presence of chronic physical conditions is derived from the Demographics Form question: *Do you have any chronic physical illness? (Yes, No).*

**Table 4: Study variables.**

<b>Variables of Interest</b>	
Quality of life	Continuous variable
Living arrangement	Lives with unrelated person Lives alone (reference category) Lives with family
Social support	Continuous variable
<b>Demographic Variables</b>	
Age	Continuous variable
Sex	Male (0), Female (1)
Marital status	Single/ never married Separated/ divorced/ widowed (reference category) Married/ common law
Employment status	No (0), Yes (1)
<b>Clinical Variables</b>	
Psychiatric diagnosis	Mood disorder Anxiety disorder Schizophrenia
Number of previous psychiatric hospitalizations (lifetime)	Continuous variable
Presence of chronic physical illness	No (0), Yes (1)

## 4.6 Statistical Analysis

There were three components to the analysis of this thesis: (1) examination of descriptive statistics; (2) bivariate analysis of study variables of interest; and (3) linear regression modeling to estimate the association between living arrangement and quality of life, and to assess for mediation. For all analyses, a p-value of 0.05 was considered statistically significant. All analyses were performed using SAS version 9.3 (SAS Institute Inc., 2011).

### 4.6.1 Descriptive Statistics

Descriptive statistics were calculated for all variables. Means and standard deviations were assessed for continuous variables and frequencies and percentages for categorical variables.

### 4.6.2 Bivariate Analysis

Bivariate analyses were conducted to explore how study variables are related, and to assess whether individuals with missing data differ from individuals with complete data.

To explore how study variables are related cross tabulations were calculated. In addition, it was necessary to determine whether individuals with complete data for all study variables differed significantly from those with missing data. To assess this, descriptive statistics for the missing data and complete data subgroups were compared. For categorical variables samples were compared using chi-square tests and for continuous variables t-test were used to compare normally distributed variables, and Mann-Whitney U test were used to compare non-normally distributed variables.

### 4.6.3 Objective 1

#### 4.6.3.1 Linear Regression Analysis

This thesis included linear regression analysis. Normality, linearity and homoscedasticity assumptions of linear regression were tested through visual inspection of residual versus predictor plots and a histogram of the residuals.

Linear regression was used to estimate the association between living arrangement and quality of life in adults with mental illness (Equation 1).

$$Y = B_0 + B_1X_1 + e \quad (1)$$

where,

$Y$  = Quality of life

$X_1$  = Living arrangement

$e$  = Random component

Age, sex, marital status, employment status, psychiatric diagnosis, chronic physical conditions, number of psychiatric hospitalizations and social support are all associated with quality of life and living arrangement as such they were added to the model (Equation 2).

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + e \quad (2)$$

where,

$Y$  = Quality of life

$X_1$  = Living arrangement

$X_2$  = Demographic variables

$X_3$  = Clinical variables

$X_4$  = Social support

$e$  = Random component

## 4.6.4 Objective 2

### 4.6.4.1 Mediation Analysis

The method proposed by Baron and Kenny (1986) was used to assess if social support mediates the relationship between living arrangement and quality of life in adults with mental illness. In the Baron and Kenny method, once a direct effect is established between the dependent and independent variable three regression equations are estimated to test for mediation: (1) regressing the mediator on the independent variable (Equation 3), (2) regressing the dependent variable on the mediator (Equation 4), and (3) regressing the dependent variable on both the independent variable and on the mediator (Equation 5) (Baron & Kenny, 1986).

Mediation is established if the following conditions hold: (1) the independent variable affects the dependent variable in regression, (2) the independent variable affects the mediator in regression, and (3) the mediator affects the dependent variable in regression (Baron & Kenny, 1986).

$$M = B_0 + B_1X + e \quad (3)$$

$$Y = B_0 + B_1M + e \quad (4)$$

$$Y = B_0 + B_1X + B_2M + e \quad (5)$$

where,

X = Living arrangement

M = Social support

Y = Quality of life

e = Random components

## Chapter 5

### 5 Results

#### 5.1 Descriptive Statistics

Of the 380 participants, 294 (77.4%) had complete data for all measures. Descriptive statistics are presented in Table 5. The average age of participants was 40 years. By design, the sample had slightly more women than men (53.4% and 46.6% respectively). Of the 294 participants, 60.5% reported being single or never married; 25.5% reported being separated, divorced or widowed; and 14% reported being married or in a common law relationship. Approximately, 27% reported being currently employed.

Over 61% of participants reported having at least one previous psychiatric hospitalization. Approximately, 77.2% reported the presence of a mood disorder, 45.6% an anxiety disorder and 24.83% schizophrenia (percentages sum to greater than 100% indicating that some participants have been diagnosed with more than one mental illness). In addition, 65.3% of participants reported the presence of a chronic physical condition.

Among the 294 participants, the average social support score was 121.72 (22.50), the average quality of life score was 4.34 (1.45). Approximately, 57.5% live with an unrelated person, 20.1% live alone and 22.5% live with family. In comparison to the general Canadian population, the 2006 Canadian Census reported that 69.6% lived with family, 26.8% lived alone and 3.7% lived with an unrelated person (Employment and Social Development Canada, 2014).

**Table 5: Descriptive statistics. N = 294.**

<b>Variable</b>	<b>Frequency (%)</b>	<b>Mean (SD)</b>
<b>Quality of life</b>		4.34 (1.45)
<b>Current living arrangement</b>		
Live with unrelated person	169 (57.48)	
Lives alone	59 (20.06)	
Lives with family	66 (22.45)	
<b>Age</b>		40.35 (12.79)
<b>Sex</b>		
Male	137 (46.60)	
Female	157 (53.40)	
<b>Marital status</b>		
Single/ Never married	178 (60.54)	
Separated/ Divorced/ Widowed	75 (25.51)	
Married/ Common law	41 (13.95)	
<b>Currently employed</b>	79 (26.87)	
<b>Psychiatric diagnosis</b>		
Mood disorder	227 (77.21)	
Anxiety disorder	134 (45.58)	
Schizophrenia	73 (24.83)	
<b>Number of psychiatric hospitalizations</b>		
0	113 (38.43)	
1 – 8	130 (44.22)	
9 or more	51 (17.35)	
<b>Any chronic physical illnesses</b>	192 (65.30)	
<b>Social support</b>		121.72 (22.50)

## 5.2 Bivariate Analysis

Bivariate analyses were conducted to explore how study variables are related, and to assess whether individuals with missing data differ from individuals with complete data.

To explore how study variables are related cross tabulations were calculated. Tables 6 and 7 present the cross tabulations of quality of life and social support by living arrangement respectively. The highest level of quality of life is among those who live with family and the lowest among those who live alone. Similarly, the highest level of social support is among those who live with family and the lowest among those who live alone.



**Table 6: Cross tabulation of quality of life by living arrangement.**

		Quality of Life Mean (SD)
Living Arrangement	Lives alone	4.15 (1.47)
	Lives with unrelated person	4.30 (1.47)
	Lives with family	4.61 (1.36)

**Table 7: Cross tabulation of social support by living arrangement.**

		Social Support Mean (SD)
Living Arrangement	Lives alone	116.20 (22.65)
	Lives with unrelated person	119.07 (20.95)
	Lives with family	133.45 (22.45)

In addition, a Pearson product-moment correlation coefficient was computed to assess the relationship between marital status and living arrangement, as correlation was suspected. However, the results suggest no correlation between the two variables ( $r=-0.042$ ,  $p=0.474$ ).

Finally, it was necessary to determine whether individuals with complete data for all study variables differed significantly from those with missing data. To assess this, descriptive statistics for the missing data and complete data subgroups were compared. For categorical variables samples were compared using chi-square tests and for continuous variables t-test were used to compare normally distributed variables, and Mann-Whitney U test were used to compare non-normally distributed variables. There were no statistically significant differences found between the complete and reduced samples.

## 5.3 Linear Regression Analyses

### 5.3.1 Objective 1

Table 8 presents the results of the first model, bivariate analysis of living arrangement and quality of life. These results suggest that although quality of life varies among types of living arrangement, the association is not statistically significant.

**Table 8: Linear regression analysis: Quality of life and living arrangement.**

Variable	$\beta$	Standard Error	95% CI	P-value	*
<b>Living arrangement</b>					
Lives alone			<b>Reference</b>		
Live with unrelated person	0.149	0.219	(-0.281, 0.580)	0.496	
Lives with family	0.454	0.259	(-0.057, 0.964)	0.081	

\*denotes significance at 5 percent.

Tables 9 and 10 present the results for the second model. Table 9 adds demographic and clinical variables and Table 10 social support. Overall, the addition of demographic and clinical variables was statistically significant ( $F=8.263$ ,  $p<0.001$ ). These results suggest that living arrangement, employment status, psychiatric diagnosis, number of psychiatric hospitalizations, and presence of chronic physical illness are associated with quality of life.

Specifically, these results suggest that quality of life is significantly greater in those who live with family in comparison to those who live alone; among those who are employed; and among those who have a chronic physical illness. These results also suggest that quality of life is statistically significantly greater in those with schizophrenia in comparison to those with mood disorders; and statistically significantly lower in those with an anxiety disorder in comparison to those with a mood disorder. Additionally, these results suggest that as the number of psychiatric hospitalizations increase, quality of life decreases.

**Table 9: Linear regression analysis: Quality of life, living arrangement, demographic and clinical variables.**

<b>Variable</b>	<b><math>\beta</math></b>	<b>Standard Error</b>	<b>95% CI</b>	<b>P-value</b>	<b>*</b>
<b>Living arrangement</b>					
Lives alone			<b>Reference</b>		
Live with unrelated person	0.044	0.212	(-0.373, 0.461)	0.835	
Lives with family	0.572	0.265	(0.050, 1.094)	0.032	*
<b>Age</b>	0.002	0.007	(0.001, 0.050)	0.776	
<b>Sex</b>					
Male			<b>Reference</b>		
Female	-0.96	0.159	(-0.409, 0.216)	0.544	
<b>Marital status</b>					
Married/ common law			<b>Reference</b>		
Single/ never married	0.017	0.263	(-0.501, 0.536)	0.920	
Separated/ divorced/ widowed	0.334	0.280	(-0.218, 0.886)	0.235	
<b>Currently employed</b>					
No			<b>Reference</b>		
Yes	0.806	0.181	(0.150, 1.163)	<0.001	*
<b>Psychiatric diagnosis</b>					
Mood disorder			<b>Reference</b>		
Anxiety disorder	-0.659	0.168	(-0.991, -0.328)	<0.001	*
Schizophrenia	0.778	0.204	(0.379, 1.180)	<0.001	*
<b>Number of psychiatric hospitalizations (lifetime)</b>	-0.297	0.116	(-0.525, -0.069)	0.005	*
<b>Chronic physical illnesses</b>					
No			<b>Reference</b>		
Yes	-0.388	0.168	(-0.719, -0.057)	0.025	*

\*denotes significance at 5 percent.

When social support was added to the model, the association between living arrangement and quality of life became not statistically significant ( $F=19.976$ ,  $p<0.001$ ). However, there was evidence to suggest a statistically significant association between social support and quality of life. Specifically, higher levels of social support are associated with increased quality of life in adults with mental illness. The parsimonious model ( $F=11.4$ ,  $p<0.001$ ) is presented in Table 11.

**Table 10: Linear regression analysis: Quality of life, living arrangement, demographic and clinical variables, and social support.**

<b>Variable</b>	<b><math>\beta</math></b>	<b>Standard Error</b>	<b>95% CI</b>	<b>P-value</b>	<b>*</b>
<b>Living arrangement</b>					
Lives alone			<b>Reference</b>		
Live with unrelated person	-0.078	0.180	(-0.433, 0.277)	0.665	
Lives with family	0.017	0.231	(-0.438, 0.472)	0.472	
<b>Age</b>	0.002	0.007		0.776	
<b>Sex</b>					
Male			<b>Reference</b>		
Female	-0.171	0.135	(-0.437, 0.094)	0.205	
<b>Marital status</b>					
Married/ common law			<b>Reference</b>		
Single/ never married	0.064	0.223	(-0.376, 0.504)	0.775	
Separated/ divorced/ widowed	0.325	0.238	(-0.143, 0.794)	0.173	
<b>Currently employed</b>					
No			<b>Reference</b>		
Yes	0.436	0.158	(0.126, 0.746)	0.006	*
<b>Psychiatric diagnosis</b>					
Mood disorder			<b>Reference</b>		
Anxiety disorder	-0.472	0.144	(-0.756, -0.189)	0.001	*
Schizophrenia	0.645	0.174	(0.303, 0.987)	<0.000	*
<b>Number of psychiatric hospitalizations (lifetime)</b>	-0.260	0.098	(-0.454, -0.67)	0.009	*
<b>Chronic physical illnesses</b>					
No			<b>Reference</b>		
Yes	-0.439	0.143	(-0.720, -0.158)	0.002	*
<b>Social support</b>	0.033	0.003	(0.027, 0.039)	<0.001	*

\*denotes significance at 5 percent.

**Table 11: Linear regression analysis: Quality of life, living arrangement, demographic and clinical variables, and social support (parsimonious model).**

Variable	$\beta$	Standard Error	95% CI	P-value	*
<b>Living arrangement</b>					
Lives alone			<b>Reference</b>		
Live with unrelated person	0.083	0.180	(-0.437, 0.271)	0.644	
Lives with family	-0.058	0.211	(-0.472, 0.357)	0.784	
<b>Currently employed</b>					
No			<b>Reference</b>		
Yes	0.432	0.158	(0.007, 0.122)	0.007	*
<b>Psychiatric diagnosis</b>					
Mood disorder			<b>Reference</b>		
Anxiety disorder	-0.471	0.143	(-0.752, -0.190)	<0.001	*
Schizophrenia	0.662	0.171	(0.325, 1.000)	<0.001	*
<b>Number of psychiatric hospitalizations (lifetime)</b>	-0.251	0.098	(-0.444, -0.059)	0.011	*
<b>Chronic physical illnesses</b>					
No			<b>Reference</b>		
Yes	-0.405	0.140	(-0.680, -0.131)	0.004	*
<b>Social support</b>	0.033	0.003	(0.027, 0.039)	<0.001	*

\*denotes significance at 5 percent.

### 5.3.2 Objective 2

Although, there was no evidence to suggest a statistically significant association between living arrangement and quality of life (at the 5% significance level) in the unadjusted model, mediation analysis was completed to assess social support as a mediator. This analysis was carried out based on two findings: (1) there was a statistically significant association between living arrangement (living with family) and quality of life in the model that adjusted for demographic and clinical variables (Table 9); and (2) there was a change in the direction and magnitude of the effect of living arrangement on quality of life when social support was introduced into the model (Tables 10 & 11).

To test the significance of the medication effect of social support on the living arrangement quality of life relationships, Steps 2 and 3 of the Baron and Kenny (1986) method were

completed as well as a Sobel Test to assess for the significance of mediation effects (Preacher & Kelley, 2011).

Table 12 represents the results of the association between social support and living arrangement (Step 2). These results suggest that social support in those living with family is statistically significantly greater than that among those who live alone.

**Table 12: Mediation analysis: Social support and living arrangement.**

Variables	$\beta$	Standard Error	95% CI	P-value	*
<b>Living arrangement</b>					
Lives alone			<b>Reference</b>		
Lives with family	17.251	3.877	(9.621, 24.881)	<0.001	*
Lives with an unrelated person	2.862	3.272	(-3.578, 9.302)	0.383	

\*denotes significance at 5 percent.

Table 13 presents the results of the association between quality of life and social support (Step3) and suggests that social support is positively statistically significantly associated with quality of life.

**Table 13: Mediation analysis: Quality of life and social support.**

Variables	$\beta$	Standard Error	95% CI	P-value	*
<b>Social support</b>	0.036	0.003	(0.030, 0.042)	<0.001	*

\*denotes significance at 5 percent.

The results of the Sobel Test suggest that the association between living arrangement and quality of life is significantly mediated by social support ( $z = 4.172$ ,  $p < 0.000$ ).

## Chapter 6

### 6 Discussion

The primary objective of this thesis was to assess the relationship between living arrangement and quality of life among adults with mental illness. Mean age of participants was 40 years; with slightly more women than men. Two thirds of participants were single and over half lived with an unrelated person. Over 77% of participants had a mood disorder, 17.4% reported having nine or more psychiatric hospitalizations, and 65.3% reported the presence of a chronic physical illness.

#### 6.1 Objective 1

Linear regression analysis did not suggest a strong association between living arrangement and quality of life initially, however after adjusting for demographic and clinical variables there was evidence to suggest that quality of life in those who live with family is statistically significantly greater than among those who live alone.

Furthermore, there was evidence to suggest that employment status, psychiatric diagnosis, number of psychiatric hospitalizations, and presence of chronic physical illness are statistically significantly associated with quality of life. Specifically, these results suggest that quality of life among those who are employed is statistically significantly greater than among those who are unemployed; quality of life is statistically significantly greater in those with schizophrenia and lower in those with an anxiety disorder in comparison to those with mood disorders; that as the number of psychiatric hospitalizations increase quality of life decreases; and those with a chronic physical illness have significantly lower quality of life in comparison to those without a chronic physical illness. These findings are consistent with what is reported in the existing literature.

However, when social support was added to the model, the association between living arrangement and quality of life became not statistically significant. This result is surprising, because while the relationship between living arrangement and quality of life in adults with

mental illness is not well understood, the literature suggests that it is a significant determinant of quality of life in older adults.

One potential explanation is that the objective measure of living arrangement does not capture an individual's subjective experience of their social relationships in the same way it does in older adults. For example, living alone may more often be accompanied by loneliness or loss in older adults than it is in adults with mental illness.

Loneliness has been defined as an individual's state of mind and negative feelings about their level of social contact that often results from discrepancies between ideal and perceived social relationships (Weiss, 1973). Living alone may capture loneliness in older adults associated with age-related changes in social networks (Greenfield & Russell, 2011). For example, the quantity and quality of an individual's social interactions may change due to the loss of relationships through death of close others or through the loss of one's own functional health (Greenfield & Russell, 2011). In fact, studies have identified living alone to be one of the most consistent predictors of loneliness among older adults (Greenfield & Russell, 2011). However, in adults with mental illness living alone could provide respite from negative interactions or be an indicator of independence. Future studies should consider assessing the effect of loneliness on the relationship between living arrangements and quality of life. Another potential explanation is that social support mediates the relationship between living arrangement and quality of life. That is to say, living arrangement may influence an individual's feelings of social support which may in turn affect their quality of life. This hypothesis is explored in Objective 2.

## 6.2 Objective 2

It was hypothesized that social support may have indirect effects on the association between living arrangement and quality of life. As such, mediation analysis was completed despite the fact that there was no statistically significant association between living arrangement and quality of life in the unadjusted model.



Mediation analysis was carried out based on two findings: (1) there was a statistically significant association between living arrangement (living with family) and quality of life in the model that adjusted for demographic and clinical variables (Table 9); and (2) there was a change in the direction and magnitude of the effect of living arrangement on quality of life when social support was introduced into the model (Tables 10 & 11).

Additional support for the hypothesis that the association between living arrangement and quality of life is mediated by social support was suggested in the statistically significant associations found between social support and quality of life (Table 12); and social support and living arrangement (Table 13). Specifically, the results suggest that social support was positively and statistically significantly associated with quality of life in adults with mental illness and that social support in those living with family was statistically significantly greater than that among those who live alone. Finally, the results of a Sobel Test suggest that association between living arrangement and quality of life is significantly mediated by social support ( $z = 4.172$ ,  $p < 0.001$ ).

A potential explanation for these findings is that the type of household social interactions may vary by source. Perhaps, the household social interactions among adults with mental illness that live with family are more supportive in nature than the social interactions amongst those who live with unrelated persons. Future research should consider including an assessment of the quality of social interactions.

Another potential explanation is the influence of loneliness. As discussed above, loneliness is defined as an individual's state of mind and negative feelings about their level of social contact (Weiss, 1973). An individual can live alone and not be lonely, equal and opposite an individual can live with others (family or unrelated persons) and experience great feelings of loneliness. As mentioned above, future studies should consider assessing the effect of loneliness on the relationship between living arrangements and quality of life.

## 6.3 Strengths

This thesis has a number of strengths. Strengths of this thesis include: (1) addressing a gap in the literature, (2) generalizability, (3) data quality, and (4) psychometric properties.

First, although studies have identified several determinants of quality of life among adults with mental illness, the association between living arrangement and quality of life is not well understood. As such, this thesis addressed a gap in the literature. However, subject to the limitations discussed below, the findings do not indicate a strong clinical or policy role for interventions to modify living arrangements in adults living with mental illness. Second, the sample was not limited to a single diagnosis and included adults with mood disorders, schizophrenia and anxiety disorders. Additionally, the project recruited participants from the community and does not limit the sample to only those who are seeking treatment. Third, the Poverty and Social Inclusion project collected data during structured interviews. This method increases data quality and reduces measurement error due to interviewer variability, recall bias, processing errors, non-response and respondent bias. Finally, the Poverty and Social Inclusion project used valid, reliable and relevant instruments for adults with mental illness.

## 6.4 Limitations

This thesis is not without limitations. Potential limitations include: (1) selection bias, (2) measurement error including recall bias and social desirability bias, (3) sample size, (4) data availability, and (5) study design.

First, there is a potential for selection bias as a result of the Poverty and Social Inclusion project sample recruitment. The Poverty and Social Inclusion sample was recruited through public advertising and by using outreach recruitment in community agencies and public places. It is possible that those who access community agencies differ systematically from those who do not in their living arrangements as well as their quality of life. Second, there is potential for measurement bias as all data are self-reported. Because data were collected during structured interviews, and some of the items were sensitive in nature, participants may not have answered

truthfully due to social desirability bias, or may have had difficulty recalling information. Third, there is a potential that the sample size was not adequate to statistically detect a clinically or policy-significant association between the variables of interest. Fourth, as this thesis was a secondary analysis of data collected in the Poverty and Social Inclusion project, these analyses were limited due to data availability. For example, there was no measurement of loneliness, quality of social interaction, severity of illness or socioeconomic status and as such there was no way to explore its effects or adjust for its effects in linear regression analysis. In addition, this thesis used a global score for quality of life based on the QLI. As such, this thesis did not test the effects of living arrangement on specific life domains. While there was no statistically significant relationship reported between living arrangement and quality of life in adults with mental illness, living arrangement may affect specific domains of quality of life. Finally, this thesis is cross-sectional. As such, the analyses could not assess the association between living arrangement and quality of life over time.

## 6.5 Future Research

To address the limitations of this thesis, future researchers should consider: (1) increasing the sample size to increase statistical power, (2) include temporality, (3) include a measure of loneliness and quality of social interactions, and (4) examine the effects of living arrangement on specific domains of quality of life.

First, an increased sample size would increase the statistical power to detect the association between living arrangement and quality of life, while at the same time reducing Type I error probabilities. Second, a longitudinal design would allow for better causal inferences because of control over directionality among the variables. Third, as loneliness may confound the relationship between living arrangement and quality of life, future research should attempt to disentangle ‘living alone’ from ‘being lonely’. Similarly, there was no way to assess the quality of household social interactions. Finally, as this analysis investigated the relationship between overall quality of life and living arrangement, future research should investigate the potential effects of living arrangement on specific domains of quality of life in adults with mental illness.

Each of these enhancements would result in a more complete understanding of the association between living arrangement and quality of life in adults with mental illness.

## Chapter 7

### 7 Conclusion

The primary objective of this thesis was to assess the relationship between living arrangement and quality of life among adults with mental illness. Initially, linear regression analysis did not suggest a strong association between quality of life and living arrangement; however, further analysis suggested that social support mediate the relationship between living arrangement and quality of life in adults with mental illness.

Because living arrangement is influenced by socioeconomic and demographic characteristics for which interventions may be possible, and adults with mental illness typically have access to fewer resources and experience greater needs than the general population, it is important to understand its relationship with quality of life. As such, future research should address the limitations of this thesis to yield a more complete understanding of the association between living arrangement and quality of life in adults with mental illness.

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## Appendices

### Appendix 1: Search Strategies.

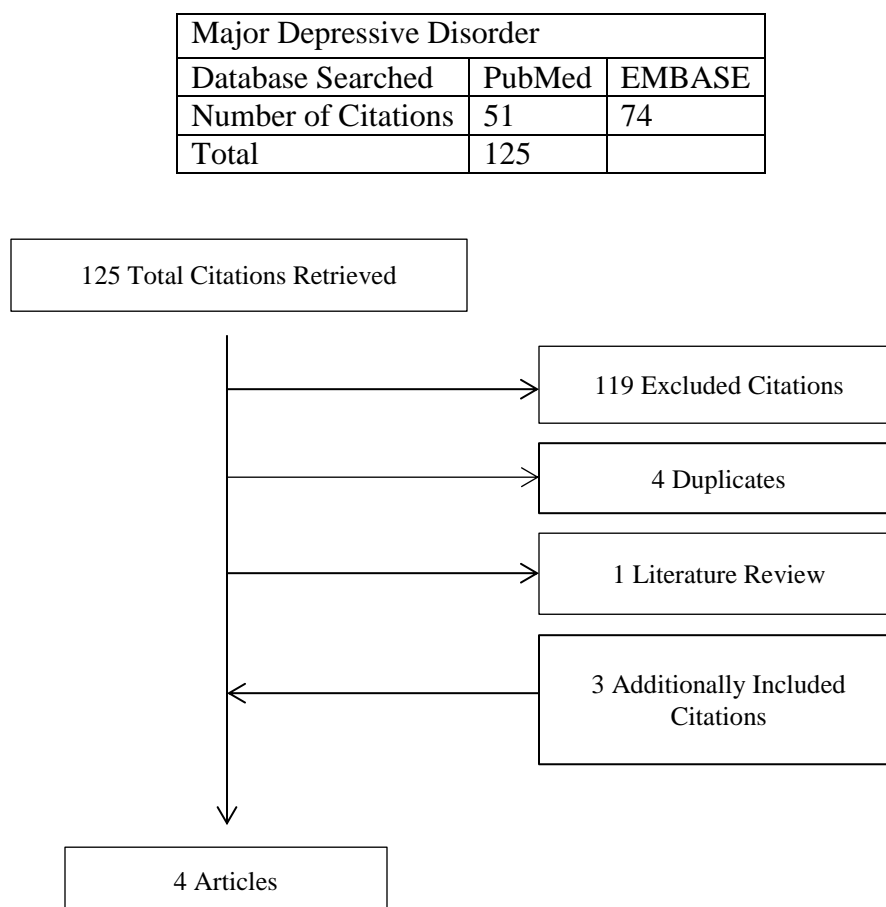
## 1 Quality of Life in Adults with Mental Illness

### 1.1 Mood Disorders

A literature search was conducted in order to identify published studies assessing quality of life in adults with major depressive disorder and bipolar disorder. The electronic databases PubMed (primary source), and EMBASE were searched simultaneously from 2005 to present. Various key words were used to identify all relevant articles. The key words for major depressive disorder included: major depression OR major depressive disorder OR recurrent depressive disorder OR depressive episode AND quality of life OR QOL OR health related quality of life OR HRQOL. The key words for bipolar disorder included: bipolar disorder AND quality of life OR QOL OR health related quality of life OR HRQOL. In addition, reference lists of relevant articles were searched to identify additional articles.

#### 1.1.1 Major Depressive Disorder

A total of 125 citations were retrieved from all databases combined. The abstracts of all articles were reviewed and studies were excluded if they were not published in English; if they did not use a validated measure of quality of life for use in adults with mental illness; if the population was aged less than 18 (youth/ children) or older than 65 (older adults); and if the primary objective was not to assess quality of life in adults with major depressive disorder, or compare it to the general population or those with chronic physical illnesses. A total of 119 articles were excluded based on the above criteria, 4 articles were duplicates, and 1 article was a literature review. An additional 3 articles, found by searching reference lists of relevant articles were also included, yielding a total of 4 citations to be used in this thesis.

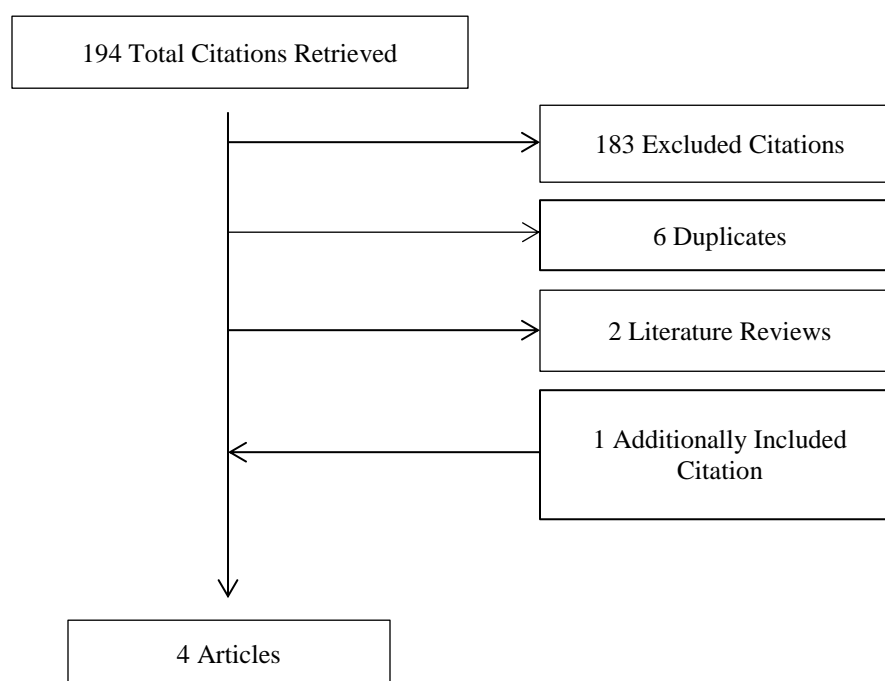
**Figure 1: Literature search results: Major depressive disorder.**

### 1.1.2 Bipolar Disorder

A total of 194 citations were retrieved from all databases combined. The abstracts of all articles were reviewed and studies were excluded if they were not published in English; if they did not use a validated measure of quality of life for use in adults with mental illness; if the population was aged less than 18 (youth/ children) or older than 65 (older adults); and if the primary objective was not to assess quality of life in adults with bipolar disorder, or compare it to the general population or those with chronic physical illnesses. A total of 183 articles were excluded based on these criteria, 6 articles were duplicates, and 2 articles were literature reviews, leaving 4 articles to be included in this review. An additional article, found by searching reference lists of relevant article was also included, yielding a total of 7 citations to be used in this thesis.

**Figure 2: Literature search results: Bipolar disorder.**

Bipolar Disorder		
Database Searched	PubMed	EMBASE
Number of Citations	70	124
Total	194	



## 1.2 Schizophrenia

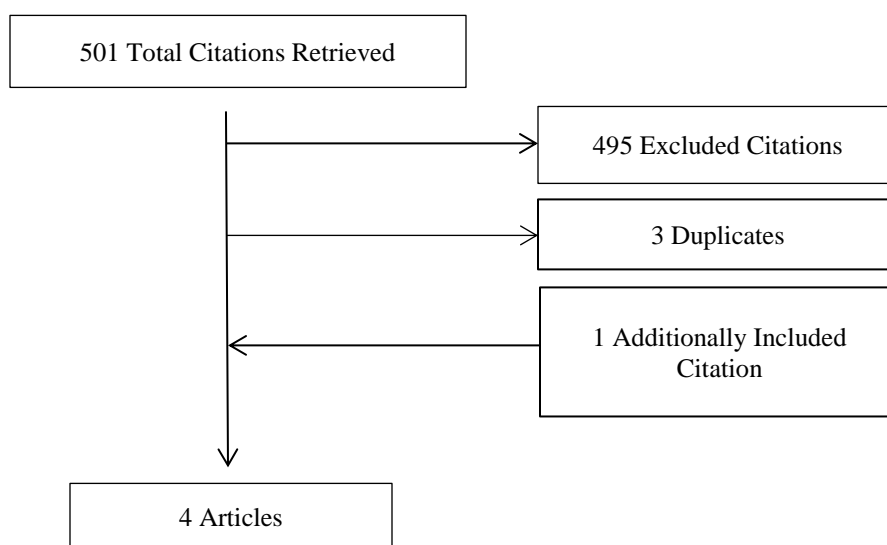
A literature search was conducted in order to identify published studies assessing quality of life in adults with schizophrenia. The electronic databases PubMed (primary source), and EMBASE were searched simultaneously from 2005 to present. Various key words were used to identify all relevant articles. The key words included: schizophrenia AND quality of life OR QOL OR health related quality of life OR HRQOL. In addition, reference lists of relevant articles were searched to identify additional articles.

A total of 501 citations were retrieved from all databases combined. The abstracts of all articles were reviewed and studies were excluded if they were not published in English; if they did not use a validated measure of quality of life for use in adults with mental illness; if the population was aged less than 18 (youth/ children) or older than 65 (older adults); and if the primary

objective was not to assess quality of life in adults with schizophrenia, or compare it to the general population or those with chronic physical illnesses. A total of 495 articles were excluded based on these criteria, 3 articles were duplicates, and 1 article was a literature review. An additional article, found by searching reference lists of relevant article was also included, yielding a total of 4 citations to be used in this thesis.

**Figure 3: Literature search results: Schizophrenia.**

Schizophrenia		
Database Searched	PubMed	EMBASE
Number of Citations	339	162
Total	501	



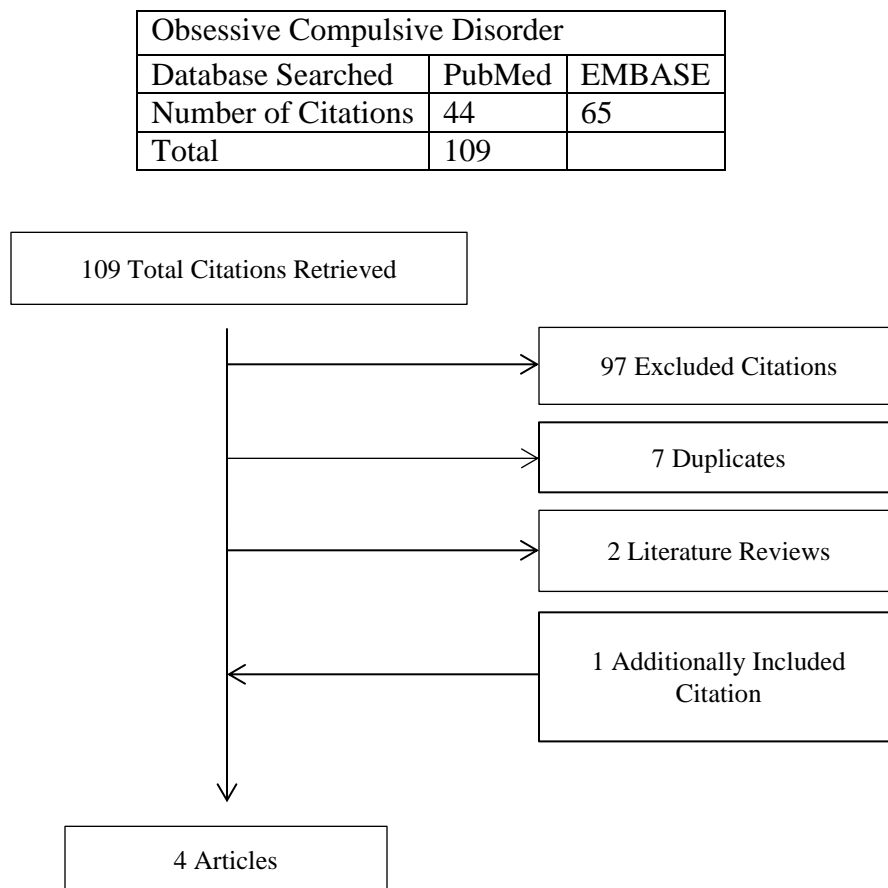
### 1.3 Anxiety Disorders

A literature search was conducted in order to identify published studies assessing quality of life in adults with anxiety disorders. The electronic databases PubMed (primary source), and EMBASE were searched simultaneously from 2005 to present. Various key words were used to identify all relevant articles. The key words included: obsessive-compulsive disorder OR panic disorder OR social anxiety disorder OR social phobia OR generalized anxiety disorder OR AND

quality of life OR QOL OR health related quality of life OR HRQOL. In addition, reference lists of relevant articles were searched to identify additional articles.

### 1.3.1 Obsessive Compulsive Disorder

A total of 109 citations were retrieved from all databases combined. The abstracts of all articles were reviewed and studies were excluded if they were not published in English; if they did not use a validated measure of quality of life for use in adults with mental illness; if the population was aged less than 18 (youth/ children) or older than 65 (older adults); and if the primary objective was not to assess quality of life in adults with obsessive compulsive disorder, or compare it to the general population or those with chronic physical illnesses. A total of 97 articles were excluded based on these criteria, 7 articles were duplicates, and 2 articles were literature reviews, leaving 3 articles to be included in this review. An additional article, found by searching reference lists of relevant articles was also included, yielding a total of 4 citations to be used in this thesis.

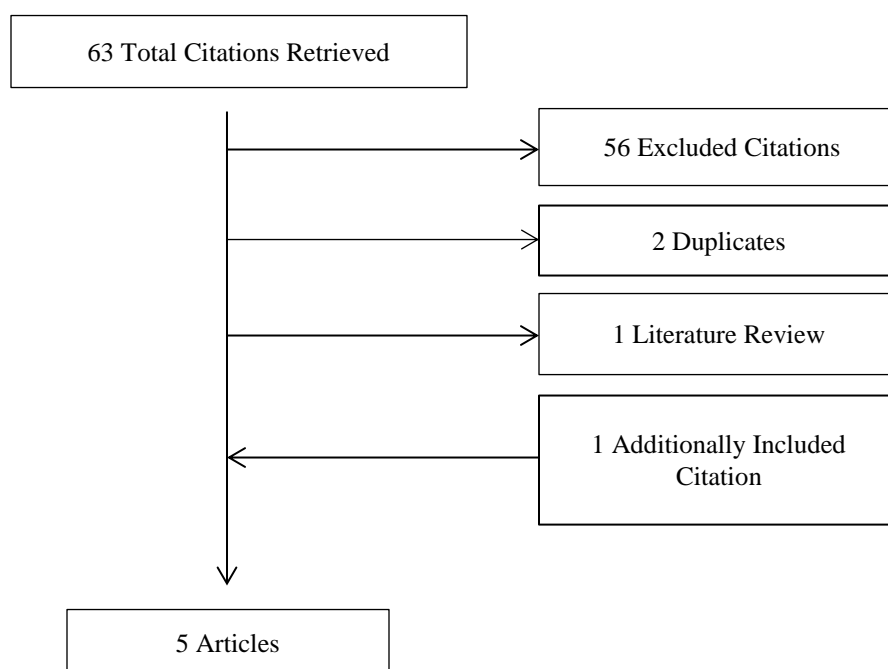
**Figure 4: Literature search results: Obsessive compulsive disorder.**

### 1.3.2 Panic Disorder

A total of 63 citations were retrieved from all databases combined. The abstracts of all articles were reviewed and studies were excluded if they were not published in English; if they did not use a validated measure of quality of life for use in adults with mental illness; if the population was aged less than 18 (youth/ children) or older than 65 (older adults); and if the primary objective was not to assess quality of life in adults with panic disorder, or compare it to the general population or those with chronic physical illnesses. A total of 56 articles were excluded based on these criteria, 2 articles were duplicates, and 1 article was a literature review, leaving 4 articles to be included in this review. An additional article, found by searching reference lists of relevant article was also included, yielding a total of 5 citations to be used in this thesis.

**Figure 5: Literature search results: Panic disorder.**

Panic Disorder		
Database Searched	PubMed	EMBASE
Number of Citations	19	44
Total	63	

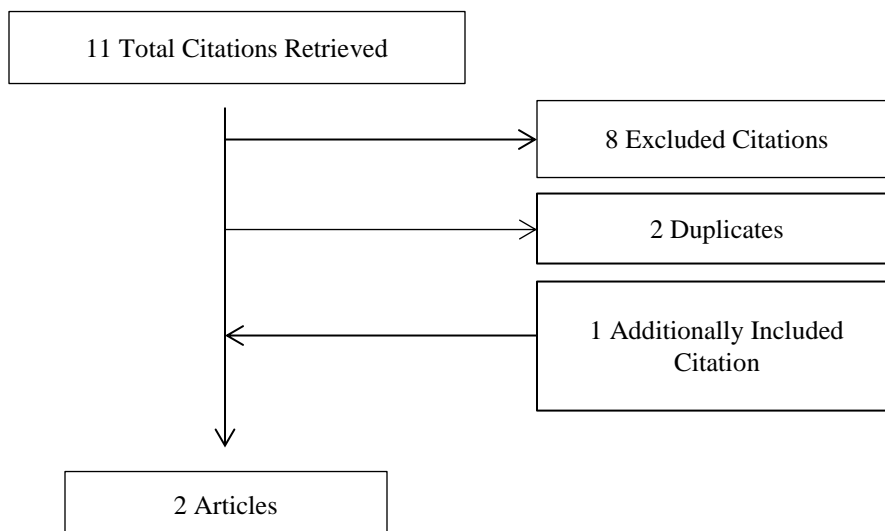


### 1.3.3 Social Anxiety Disorder

A total of 11 citations were retrieved from all databases combined. The abstracts of all articles were reviewed and studies were excluded if they were not published in English; if they did not use a validated measure of quality of life for use in adults with mental illness; if the population was aged less than 18 (youth/ children) or older than 65 (older adults); and if the primary objective was not to assess quality of life in adults with social anxiety disorder, or compare it to the general population or those with chronic physical illnesses. A total of 8 articles were excluded based on these criteria, 2 articles were duplicates, leaving 1 article to be included in this review. An additional article, found by searching reference lists of relevant article were also included, yielding a total of 2 citations to be used in this thesis.

**Figure 6: Literature search results: Social anxiety disorder.**

Social Anxiety Disorder		
Database Searched	PubMed	EMBASE
Number of Citations	6	5
Total	11	



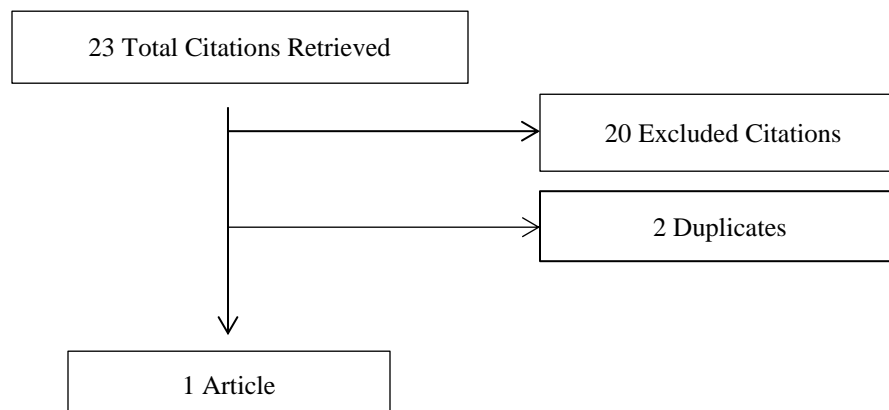
### 1.3.3.1 Generalized Anxiety Disorder

A total of 23 citations were retrieved from all databases combined. The abstracts of all articles were reviewed and studies were excluded if they were not published in English; if they did not use a validated measure of quality of life for use in adults with mental illness; if the population was aged less than 18 (youth/ children) or older than 65 (older adults); and if the primary objective was not to assess quality of life in adults with generalized anxiety disorder, or compare it to the general population or those with chronic physical illnesses. A total of 20 articles were excluded based on these criteria, 2 articles were duplicates leaving 1 article to be included in this review.



**Figure 7: Literature search results: Generalized anxiety disorder.**

Generalized Anxiety Disorder		
Database Searched	PubMed	EMBASE
Number of Citations	15	8
Total	23	

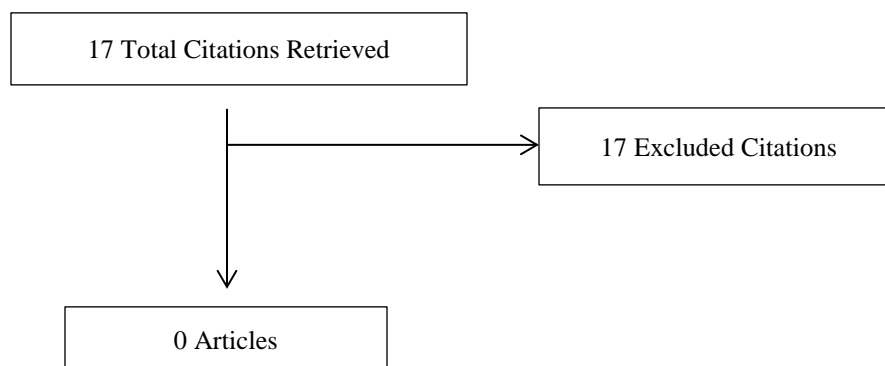


## 2 Quality of Life and Living Arrangement

A literature search was conducted in order to identify published studies assessing the relationship between quality of life and living arrangement in adults with mental illness. The electronic databases PubMed (primary source), and EMBASE were searched simultaneously from 2005 to present. Various key words were used to identify all relevant articles. The key words included: major depression OR major depressive disorder OR recurrent depressive disorder OR depressive episode OR bipolar disorder OR schizophrenia OR obsessive-compulsive disorder OR panic disorder OR posttraumatic stress disorder OR social anxiety disorder OR social phobia OR generalized anxiety disorder OR mental illness AND quality of life OR QOL OR health related quality of life OR HRQOL AND living arrangement OR household type OR dwelling. In addition, reference lists of relevant articles were searched to identify additional articles.

**Figure 8: Literature search results: Quality of life and living arrangement in adults with mental illness.**

Quality of Life and Living Arrangement in Adults with Mental Illness		
Database Searched	PubMed	EMBASE
Number of Citations	14	3
Total	17	

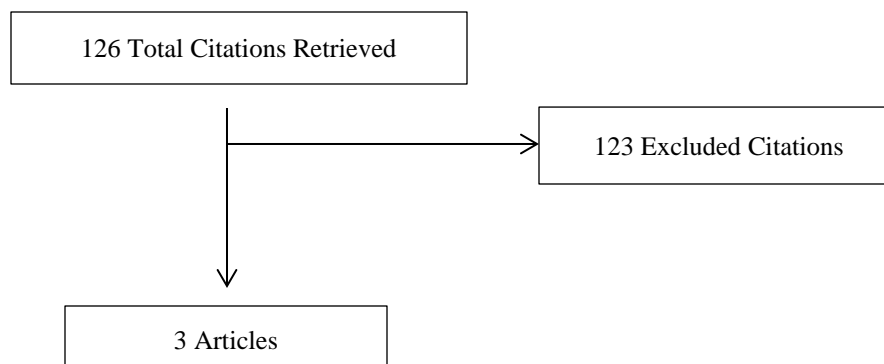


A total of 17 citations were retrieved from all databases combined. The abstracts of all articles were reviewed and studies were excluded if they were not published in English; if they did not use a validated measure of quality of life for use in adults with mental illness; if the population was aged less than 18 (youth/ children) or older than 65 (older adults); and if the primary objective was not to evaluate the relationship between quality of life and living arrangement in adults with mental illness.

The literature review did not identify any relevant studies to be included in this thesis; as such, the literature search was broadened to include other populations. The electronic databases PubMed (primary source), and EMBASE were searched simultaneously from 2005 to present using the following keywords: quality of life OR QOL OR health related quality of life OR HRQOL AND living arrangement OR household type OR dwelling. In addition, reference lists of relevant articles were searched to identify additional articles.

**Figure 9: Literature search results: Quality of life and living arrangement.**

Quality of Life and Living Arrangement		
Database Searched	PubMed	EMBASE
Number of Citations	30	96
Total	126	



A total of 126 citations were retrieved from all databases combined. The abstracts of all articles were reviewed and studies were excluded if they were not published in English; and if the primary objective was not to evaluate the relationship between quality of life and living arrangement in adults. A total of 123 articles were excluded based on these criteria, leaving 3 articles to be included in this review.

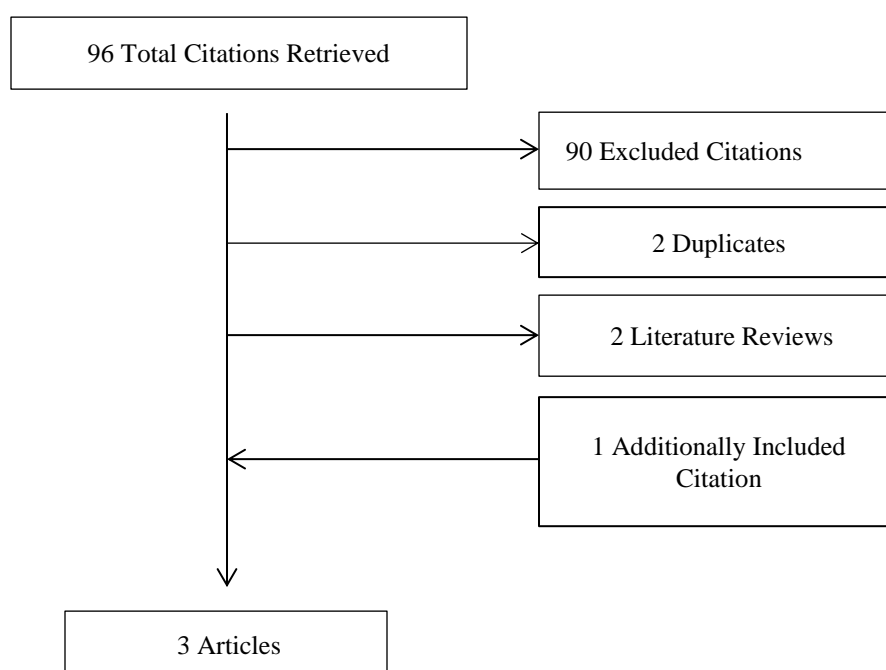
### 3 Quality of Life and Social Support

A literature search was conducted in order to identify published studies assessing the relationship between quality of life and social support in adults with mental illness. The electronic databases PubMed (primary source), and EMBASE were searched simultaneously from 2005 to present. Various key words were used to identify all relevant articles. The key words included: major depression OR major depressive disorder OR recurrent depressive disorder OR depressive episode OR bipolar disorder OR schizophrenia OR obsessive-compulsive disorder OR panic disorder OR posttraumatic stress disorder OR social anxiety disorder OR social phobia OR generalized anxiety disorder OR mental illness AND quality of life OR QOL OR health related

quality of life OR HRQOL AND social support OR social network. In addition, reference lists of relevant articles were searched to identify additional articles.

**Figure 10: Literature search results: Quality of life and social support in adults with mental illness.**

Quality of Life and Social Support in Adults with Mental Illness		
Database Searched	PubMed	EMBASE
Number of Citations	36	33
Total	96	



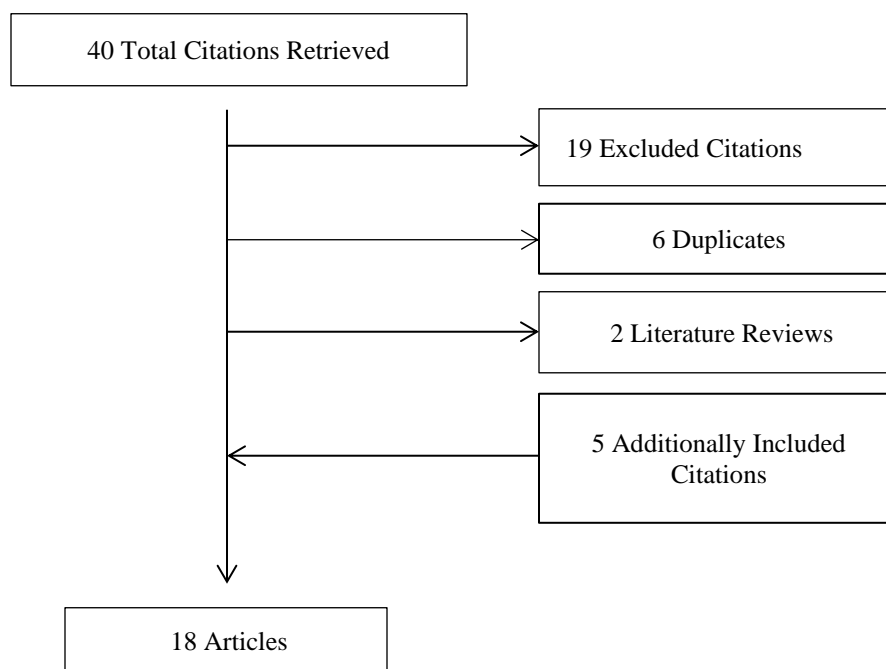
A total of 96 citations were retrieved from all databases combined. The abstracts of all articles were reviewed and studies were excluded if they were not published in English; and if the primary objective was not to evaluate the relationship between quality of life and social support in adults with mental illness. A total of 90 articles were excluded based on these criteria, 2 articles were duplicates, and 2 articles were literature reviews, leaving 2 articles to be included in this review. An additional article, found by searching reference lists of relevant articles were also included, yielding a total of 3 citations to be used in this thesis.

## 4 Demographic and Clinical Determinants of Quality of Life in Adults with Mental Illness

A literature search was conducted in order to identify published studies investigating determinants of health in adults with mental illness. The electronic databases PubMed (primary source), and EMBASE were searched simultaneously from 2005 to present. Various key words were used to identify all relevant articles. The key words included: major depression OR major depressive disorder OR recurrent depressive disorder OR depressive episode OR bipolar disorder OR schizophrenia OR obsessive-compulsive disorder OR panic disorder OR posttraumatic stress disorder OR social anxiety disorder OR social phobia OR generalized anxiety disorder OR mental illness AND quality of life OR QOL OR health related quality of life OR HRQOL AND determinants OR predictors. In addition, reference lists of relevant articles were searched to identify additional articles.

**Figure 11: Literature search results: Determinants of quality of life in adults with mental illness.**

Determinants of Quality of Life in Adults with Mental Illness		
Database Searched	PubMed	EMBASE
Number of Citations	32	18
Total	40	



A total of 40 citations were retrieved from all databases combined. The abstracts of all articles were reviewed and studies were excluded if they were not published in English; and if the primary objective was not to evaluate the relationship between quality of life and social support in adults with mental illness. A total of 19 articles were excluded based on these criteria, 6 articles were duplicates, and 2 articles were literature reviews. Five additional articles, found by searching reference lists of relevant article were also included, yielding 18 articles to be included in this review.

## Appendix 2: Research Ethics Board Approval



### Use of Human Participants - Ethics Approval Notice

Principal Investigator: Dr. Cheryl Forchuk  
 Review Number: 17815  
 Review Level: Full Board  
 Approved Local Adult Participants: 700  
 Approved Local Minor Participants: 0  
 Protocol Title: Poverty & Social Inclusion  
 Department & Institution: Nursing, University of Western Ontario  
 Sponsor: Social Sciences and Humanities Research Council

Ethics Approval Date: April 21, 2011

Expiry Date: May 31, 2016

#### Documents Reviewed & Approved & Documents Received for Information:

Document Name	Comments	Version Date
UWO Protocol		
Letter of Information & Consent	Psychiatric Survivor Interview Version 2	2011/03/29
Letter of Information & Consent	Staff Version 2	2011/03/29
Letter of Information & Consent	Psychiatric Survivor Focus group Version 2	2011/03/29
Letter of Information & Consent	Family - Version 2	2011/03/29
Advertisement	Version 2	2011/03/29
Advertisement	Version 1	2010/05/31
Advertisement	Version 1	2010/03/30
Other	Information for Lanyard and Key chains Version 1	2010/05/31

This is to notify you that the University of Western Ontario Health Sciences Research Ethics Board (HSREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the Health Canada/ICH Good Clinical Practice Practices: Consolidated Guidelines; and the applicable laws and regulations of Ontario has reviewed and granted approval to the above referenced study on the approval date noted above. The membership of this HSREB also complies with the membership requirements for REB's as defined in Division 5 of the Food and Drug Regulations.

The ethics approval for this study shall remain valid until the expiry date noted above assuming timely and acceptable responses to the HSREB's periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the UWO Updated Approval Request form.

Member of the HSREB that are named as investigators in research studies, or declare a conflict of interest, do not participate in discussions related to, nor vote on, such studies when they are presented to the HSREB.

The Chair of the HSREB is Dr. Joseph Gilbert. The UWO HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.

Signature

#### Ethics Officer to Contact for Further Information

Janice Sutherland	Kristabeth Warholt	Grace Kelly
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**The University of Western Ontario**  
 Office of Research Ethics

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 PH: 519-661-3036 • F: 519-850-2466 • [ethics@uwo.ca](mailto:ethics@uwo.ca) • [www.uwo.ca/research/ethics](http://www.uwo.ca/research/ethics)

## Curriculum Vitae

**Name:** Meaghan McKillop

**Post-secondary Education and Degrees:** The University of Western Ontario  
London, Ontario, Canada  
2012-2015 MSc

The University of Ottawa  
Ottawa, Ontario, Canada  
2009-2011 MA

The University of Western Ontario  
London, Ontario, Canada  
2004-2008 BA

**Related Work Experience:** Project Support Analyst  
St. Joseph's Health Care, London  
2014-present

Graduate Research Assistant  
The University of Western Ontario  
2013-2014

Research Coordinator  
Lawson Health Research Institute  
2011-2013

### Publications:

1. Forchuk, C., Rudnick, A., Hoch, J., Godin, M., Donnelle, L., Campbell, R., Osaka, W., Edwards, B., Osuch, E., Norman, R., Vingillis, E., Mitchell, B., Reiss, J., Petrenko, M., Corring, D., McKillop, M. (2013) Mental Health Engagement Network. *International Journal on Advances in Life Sciences*, 5, 1 – 10.
2. Forchuk, C., Rudnick, A., Hoch, J., Donnelle, L., Campbell, R., Osaka, W., Edwards, B., Osuch, E., Norman, R., Vingillis, E., Mitchell, B., Reiss, J., Corring, D., Petrenko, M., Godin, M., Reed, J., & McKillop, M. (in press). Mental Health Engagement Network: Innovating Community-Based Mental Healthcare. *Journal of General Practice*.